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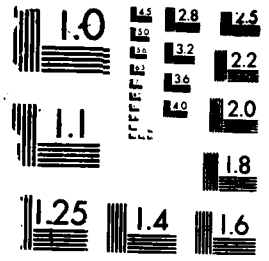

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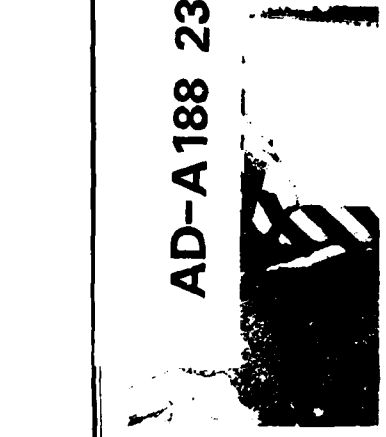

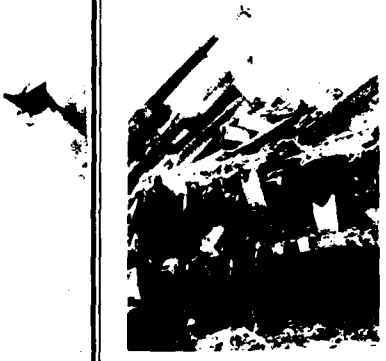

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STATE-OF-THE-ART FOR ASSESSING EARTHQUAKE HAZARDS IN THE UNITED STATES

Report 25
PARAMETERS FOR SPECIFYING INTENSITY-RELATED EARTHQUAKE GROUND MOTIONS

by

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A set of 12 charts are presented that relate Modified Mercalli intensity units to peak horizontal acceleration, velocity and duration for near field and far field locations, hard and soft sites, and sizes of earthquakes. Also shown is the mean, mean plus one standard deviation, mean plus two standard deviations, and the highest observed values. Ratios are provided of vertical to horizontal motions and predominant periods.

These charts are for use with known fault sources and for floating earthquakes in zones where there are no identifiable causative faults. The procedure for using parameters for shaping time histories to be used for dynamic analyses.

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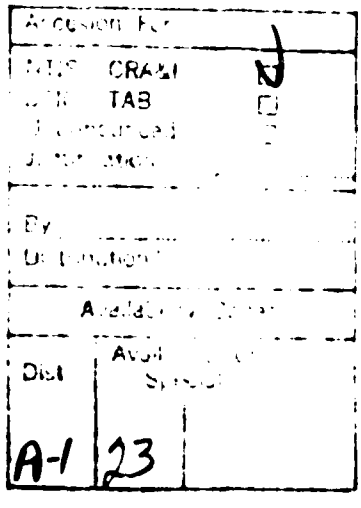
PREFACE

This study was prepared and the report written by Dr. E. L. Krinitzsky and Mr. Frank K. Chang of the Engineering Geology and Rock Mechanics Division (EGRMD) and the Earthquake Engineering and Geophysics Division (EEGD), respectively, in the Geotechnical Laboratory (GL) of the US Army Engineer Waterways Experiment Station (WES). The report is a part of ongoing work in Civil Works Investigation "Earthquake Hazard Evaluations for Engineering Sites," sponsored by Office, Chief of Engineers (OCE), US Army. Technical Monitor for OCE was Mr. Ben I. Kelly.

The authors are grateful to Dr. Otto W. Nuttli of St. Louis University and Dr. A. G. Brady of the US Geological Survey in Menlo Park for helpful opinions and review of the curves that were developed. Mr. Dale Barefoot of EGRMD assisted with the assemblage of data and the preparation of the charts. General supervision was by Dr. D. C. Banks, Chief, EGRMD, and Dr. W. F. Marcuson III, Chief, GL.

COL Allen F. Grum, USA, was the previous Director of WES. COL Dwayne G. Lee, CE, is the present Commander and Director. Dr. Robert W. Whalin is Technical Director.



CONTENTS

I. INTRODUCTION

This paper describes a method for estimating earthquake ground motions that is based on intensity and is site specific. The motions are for applications in engineering where dynamic analyses are contemplated that require cyclical loads approximating the effects of earthquakes as they would be felt in the free field at the site.

Over most of the United States, and most of the world, all that is known of earthquake history is from intensity. Also, very seldom are the fault sources determinable. This method is designed particularly for these very extensive areas. However, the method is applicable as well to areas where fault sources can be taken into account.

II. INTENSITY SCALES

The Modified Mercalli (MM) intensity scale of 1931 is the basis for this study. The MM scale is discussed by Richter (1958) and Barosh (1969). Figure 1 contains an abridged version by Wood and Neumann (1931).

Figure 2 shows a comparison of the MM scale with those of the Japanese Meteorological Agency (see Okamoto, 1973), the Peoples Republic of China (Hsieh, 1957), Rossi-Forel (see Richter, 1958) and Medvedev, Sponheuer and Karnik (Medvedev and Sponheuer, 1969).

Of the above scales, the oldest is the Rossi-Forel which was created in 1883 and was widely adopted. It can be seen that the Rossi-Forel scale does not distinguish between levels of severe damage. To correct this deficiency, a scale was devised by Mercalli in 1902 with ten grades, later extended to twelve grades. Sieberg in 1923 developed a version of the later scale that then became the basis for a revision made by H. O. Wood and Frank Neumann (1931) resulting in the MM scale of today. The Medvedev, Sponheuer and Karnik version is a slight modification of the MM. The Chinese scale is identical with MM.

Of the intensity scales commonly used today, only the Japanese differs significantly. Correlation of the Japanese scale to MM can be accomplished by the following equation given by Okamoto (1973):

$$I_{MM} = 0.5 + 1.5\ I_{JMA} \qquad (1)$$

Referring to Figure 1, we see that intensity is principally a measure of damage. We should keep in mind that a scale need not measure actual damage since there may not be susceptible structures available. A scale lists the

potential for damage. Because of the vagaries of earthquake motions in all places, an intensity scale refers to the predominant level of damage in any specified area.

In this study, the MM levels were grouped separately for calculation purposes as is shown in Appendix A. The intensity values were from observations at the sites with strong motion instruments or from isoseismal maps pertinent to those sites.

MODIFIED MERCALLI INTENSITY SCALE OF 1931

(Abridged)

I. Not felt except by a very few under especially favorable circumstances.

II. Felt only by a few persons at rest, especially on upper floors of buildings. Delicately suspended objects may swing.

III. Felt quite noticeably indoors, especially on upper floors of buildings, but many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibration like passing of truck. Duration estimated.

IV. During the day felt indoors by many, outdoors by few. At night some awakened. Dishes, windows, doors disturbed; walls made cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.

V. Felt by nearly everyone; many awakened. Some dishes, windows, etc., broken; a few instances of cracked plaster; unstable objects overturned. Disturbance of trees, poles and other tall objects sometimes noticed. Pendulum clocks may stop.

VI. Felt by all; many frightened and run outdoors. Some heavy furniture moved; a few instances of fallen plaster or damaged chimneys. Damage slight.

VII. Everybody runs outdoors. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable in poorly built or badly designed structures; some chimneys broken. Noticed by persons driving motor cars.

VIII. Damage slight in specially designed structures; considerable in ordinary substantial buildings with partial collapse; great in poorly built structures. Panel walls thrown out of frame structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. Sand and mud ejected in small amounts. Changes in well water. Disturbed persons driving motor cars.

IX. Damage considerable in specially designed structures; well designed frame structures thrown out of plumb; great in substantial buildings, with partial collapse. Buildings shifted off foundations. Ground cracked conspicuously. Underground pipes broken.

X. Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations; ground badly cracked. Rails bent. Landslides considerable from river banks and steep slopes. Shifted sand and mud. Water splashed (slopped) over banks.

XI. Few, if any (masonry), structures remain standing. Bridges destroyed. Broad fissures in ground. Underground pipe lines completely out of service. Earth slumps and land slips in soft ground. Rails bent greatly.

XII. Damage total. Waves seen on ground surfaces. Lines of sight and level distorted. Objects thrown upward into the air.

Figure 1. Modified Mercalli intensity scale of 1931 (abriged)

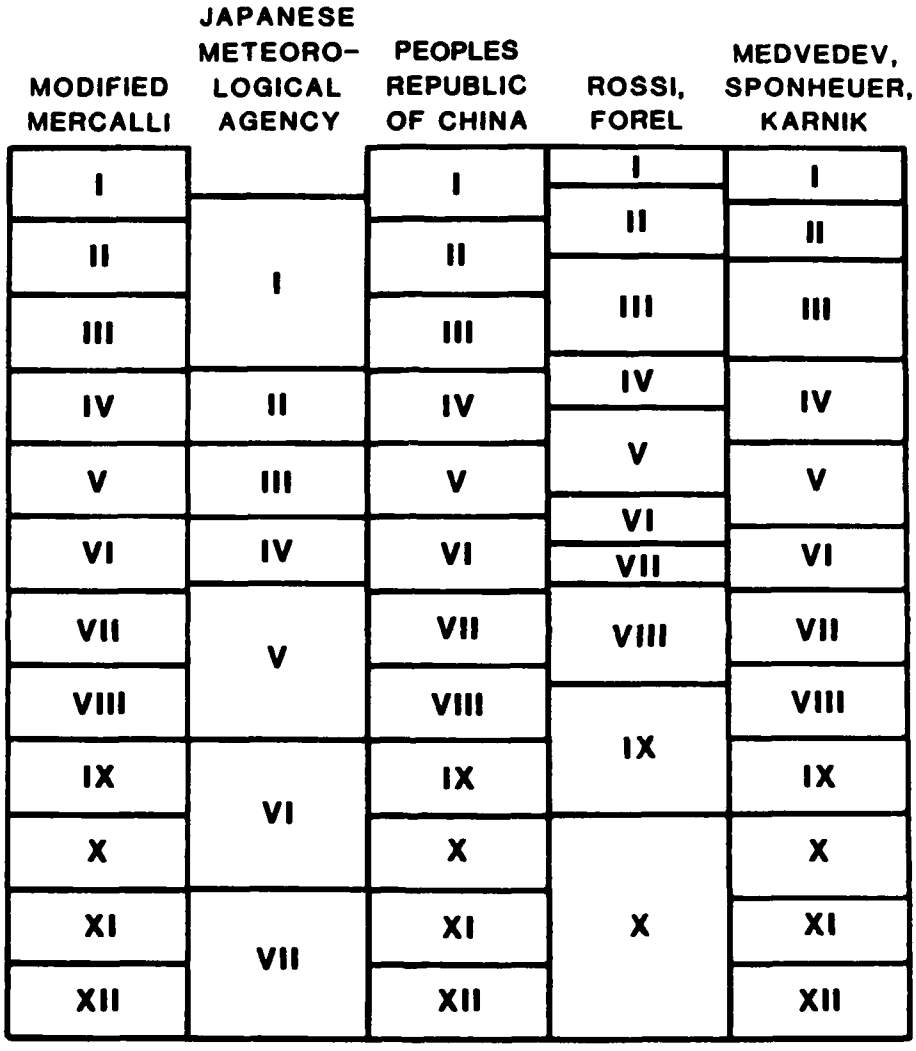


Figure 2. Comparison of selected intensity scales

III. THE DATA

The data for the intensity-motion relationships developed in this report are contained in Appendix A. The accelerograms are those of selected digitized records that were uniformly processed at the Waterways Experiment Station (WES) to obtain the elements of data in Appendix A. California Institute of Technology (CIT) catalogue numbers are given when CIT tapes were used. For others, the earthquake records are named.

A total of 987 accelerograms were used. Of these there were 679 accelerograms of horizontal motion and 308 vertical. The accelerograms in Appendix A are grouped according to the following categories:

(1) Modified Mercalli intensity

(2) Near field and far field

(3) Site conditions: whether hard or soft

(4) Far field magnitudes: $M \leq 6.9$, $M = 7.0 - 7.5$, $M \geq 7.6$

Near Field and Far Field

The concept of near field and far field was developed by Krinitzsky and Chang (1977) to improve the predictability of intensity-based ground motions. In the near field, complicated reflection and refraction of waves occur with resonance effects and mismatches that produce a large variation in the values for ground motions. In the far field, the wave patterns become more orderly and more muted. The extent of the near field varies with the size of the earthquake. Following are the limits of the near field for magnitude and epicentral intensity of shallow earthquakes. The values are

believed to be applicable everywhere since in the near field the effects of regional attenuations are not a controlling determinant for the motions.

Magnitude M	MM Maximum Intensity I_o	Maximum Distance from Source km
5.0	VI	5
5.5	VII	15
6.0	VIII	25
6.5	IX	35
7.0	X	40
7.5	XI	45

The near field and the far field categories in Appendix A are based on the above relationships.

Hard and Soft Sites

Hard sites were distinguished from soft sites on the basis of a bounding shear wave-velocity of 400 m/sec.

Representative values for shear wave velocities in unconsolidated sand, clay, sand-bearing gravel, gravel and Tertiary sediments, cited by Okamoto (1973), are given in Figure 3. A boundary is shown for these data at 400 m/sec. The appropriateness of this boundary is examined in Figure 4, also adapted from Okamoto (1973), where blow counts (N) of the Standard Penetration Test are compared with shear wave velocity. The boundary at 400 m/sec encompasses the resistance levels of unconsolidated silts and sands. More extensive work by Tonouchi, Sakayama and Imai (1983) on in-situ measurements of shear wave velocities compared with N values from 1654 tests confirms the boundary at 400 m/sec.

A minimum thickness for the layer at the surface to define a soft site is 16 m. The thickness criterion* is that used by the Port and Harbor Research

*Personal communication of Mr. Tatsuo Uwabe of the Port and Harbor Research Institute.

Institute at Yokusuka, Japan. This criterion is used in this report for uniformity in interpretation since most of the accelerogram records of large earthquakes on soft sites were provided by the Port and Harbor Research Institute.

The hard and soft categories for the sites have been classified into a total of four classes representing general geological and soils categories. These divisions are listed in Appendix A as follows:

1 = Rock
2 = Stiff Soil
} H = Hard

3 = Deep cohesionless soil ($\geq$ 16m)
4 = Soft to medium stiff clay ($\geq$ 16m)
} S = Soft

Data Categories

For each accelerogram, the following data are provided in Appendix A:

Site Classification

Magnitude of earthquake, M

Focal depth, km

Distance from source, km

Horizontal acceleration, cm/sec^2; velocity, cm/sec; displacement, cm; duration, sec $\geq$ 0.05g

Vertical acceleration, cm/sec^2; velocity, cm/sec; displacement, cm; duration sec $\geq$ 0.05g

Horizontal predominant period, sec, as taken from accelerograms

Vertical predominant period, sec, as taken from accelerograms

Type of fault

Epicentral location, latitude and longitude

Calculations

Calculations were made individually for the data groupings mentioned above. Appendix A presents these calculations. They are summarized into number of data units, the mean, the standard deviation (S.D.), mean plus S.D. and mean plus 2 S.D. These calculations were made at each MM intensity level for:

(1) Horizontal peak acceleration, velocity, displacement, and duration

(2) Vertical peak acceleration, velocity, displacement, and duration

(3) Horizontal predominant period

(4) Vertical predominant period

(5) Ratio of vertical-to-horizontal peak acceleration velocity, displacement, and duration

(6) Ratio of vertical-to-horizontal predominant period

The magnitudes of earthquakes in the far field proved to be important for causing significant differences in durations. (Durations are bracketed values for the inclusive time between accelerations of 0.05g.)

In preparing the data into charts, those categories that had differences from each other that were less than one standard deviation were combined. The final groupings into charts are those shown in Figure 5 which lists a numeration for the charts. It will be noted that there are twelve groupings.

SOIL		$VEL_{(s)}$ M/SEC
SOFT	SAND	60
	FILL	100
	SANDY CLAY	100 to 200
	CLAY	250
	MOIST SAND	340
	SAND-BEARING GRAVEL	300 to 400
HARD	GRAVEL	600
	TERTIARY SEDIMENTS	1,000 +

Figure 3. Representative shear wave velocities for soils cited by Okamoto (1973). The boundary between hard and soft was taken in this study at 400 m/sec

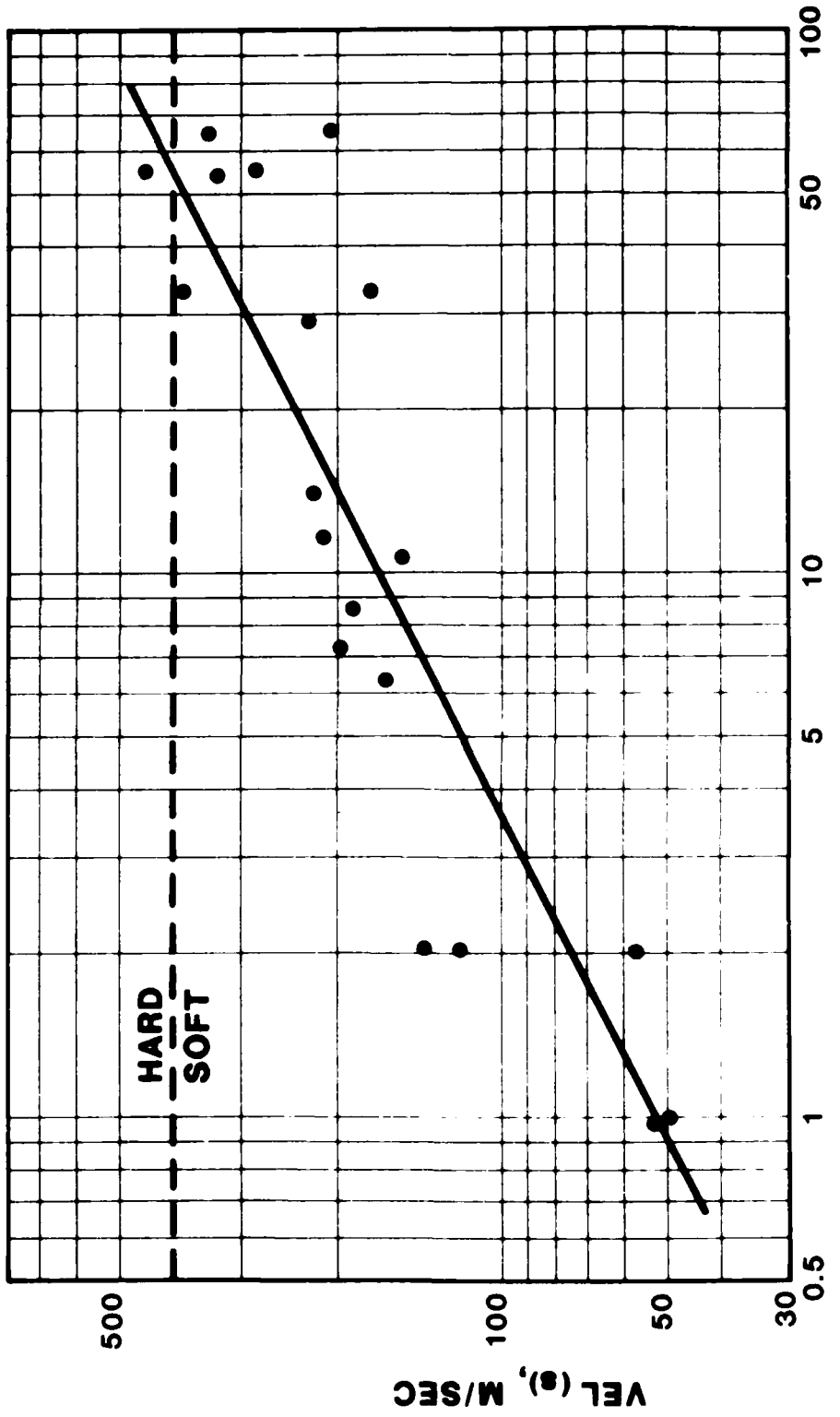


Figure 4. Blow counts and velocities in silts and sands. Modified from Okamoto (1973). The boundary assumed between hard and soft was taken in this study at 400 m/sec

IV. INTENSITY-BASED EARTHQUAKE GROUND MOTIONS

Intensity-related earthquake ground motions were developed into the twelve charts listed in Figure 5. The charts are presented as Figures 6 to 17. Following is the order of the numeration in Figure 5 and the respective equations for the mean curves:

Figure	Chart Number		
6	1	$\log a = 1.050 + 0.198I$	(2)
7	2	$\log a = 1.320 + 0.138I$	(3)
8	3	$\log a = 0.839 + 0.177I$	(4)
9	4	$\log v = -0.713 + 0.262I$	(5)
10	5	$\log v = -0.224 + 0.197I$	(6)
11	6	$\log v = -0.908 + 0.261I$	(7)
12	7	$\log v = -0.740 + 0.265I$	(8)
13	8	$\log D = -0.888 + 0.221I$	(9)
14	9	$\log D = -0.398 + 0.200I$	(10)
15	10	$\log D = -0.977 + 0.241I$	(11)
16	11	$\log D = -0.503 + 0.251I$	(12)
17	12	$\log D = -0.207 + 0.241I$	(13)

These charts are designed to provide parameters of peak motions that may be used to select either existing accelerograms, to scale existing accelerograms, to combine accelerograms, or to create synthetic accelerograms.

The accelerograms should represent, as nearly as possible:

(1) Analogous field conditions

(2) Similarity of fault mechanism

(3) Comparable earthquake magnitude

(4) Similar focal depth

(5) Similar distance of transmission, with allowance for attenuation differences

(6) Similarity of conditions at recording site

Scaling should be no greater than 2X. Scaling greater than 2X may change the spectral content of a record (see Vanmarcke, 1979). Duration should not be scaled since stretching or compressing the time element will affect the spectral content. The duration can be increased by repeating portions of the earthquake record. A decrease is achieved by removing portions of the record.

The standard deviation and limit of observed data on the charts help one to manage the dispersion in the data. Use of a mean plus one S.D. puts one in a conservative position for a major structure for which failure is not tolerable. If there is no hazard to life and there is a cost-risk benefit from a lesser design, lesser values can be taken. If a structure is on a major fault with known activity, or is in an area with a high danger to life, such as a dam above an urban area, it may be desirable to select the very worst motions, such as the mean plus two S.D., or greater. Altogether, these decisions are subjective. They depend on the judgement of the investigator and the needs of the project.

The upper limits shown for the curves are believed to be where saturation of motions occur, meaning that more severe earthquakes may not have higher values for those components of motion. Thus, these curves should not be projected beyond the terminations that are shown.

The proper predominant period will be obtained usually by selecting the accelerogram that is appropriate for the site. However, the predominant periods tabulated in Appendix A may be helpful as guides for determining which

records have desirable predominant periods. Appendix A can be helpful also if for conservatism an investigator wants to include records that have predominant periods like those of the structure under evaluation.

These charts present horizontal peak motions. To obtain vertical motions, one may use the ratios in Appendix A. A caution is that these ratios have a very high variability in the near field and especially when recordings are adjacent to causative faults.

NUMERATION OF KRINITZSKY-CHANG CURVES FOR MODIFIED MERCALLI INTENSITIES AND EARTHQUAKE GROUND MOTIONS

	NEAR FIELD		FAR FIELD		
	ALL MAGNITUDES		ALL MAGNITUDES		
	HARD SITE	SOFT SITE	HARD AND SOFT SITES		
ACCELERATION cm/sec^2	1	2	3		
			ALL MAGNITUDES HARD SITE	ALL MAGNITUDES SOFT SITE	
VELOCITY cm/sec	4	5	6		7
			$M \leq 6.9$ HARD & SOFT SITES	$M = 7.0 - 7.5$ HARD & SOFT SITES	$M \geq 7.6$ HARD & SOFT SITES
DURATION BRACKETED $\geq 0.05g$ sec	8	9	10	11	12

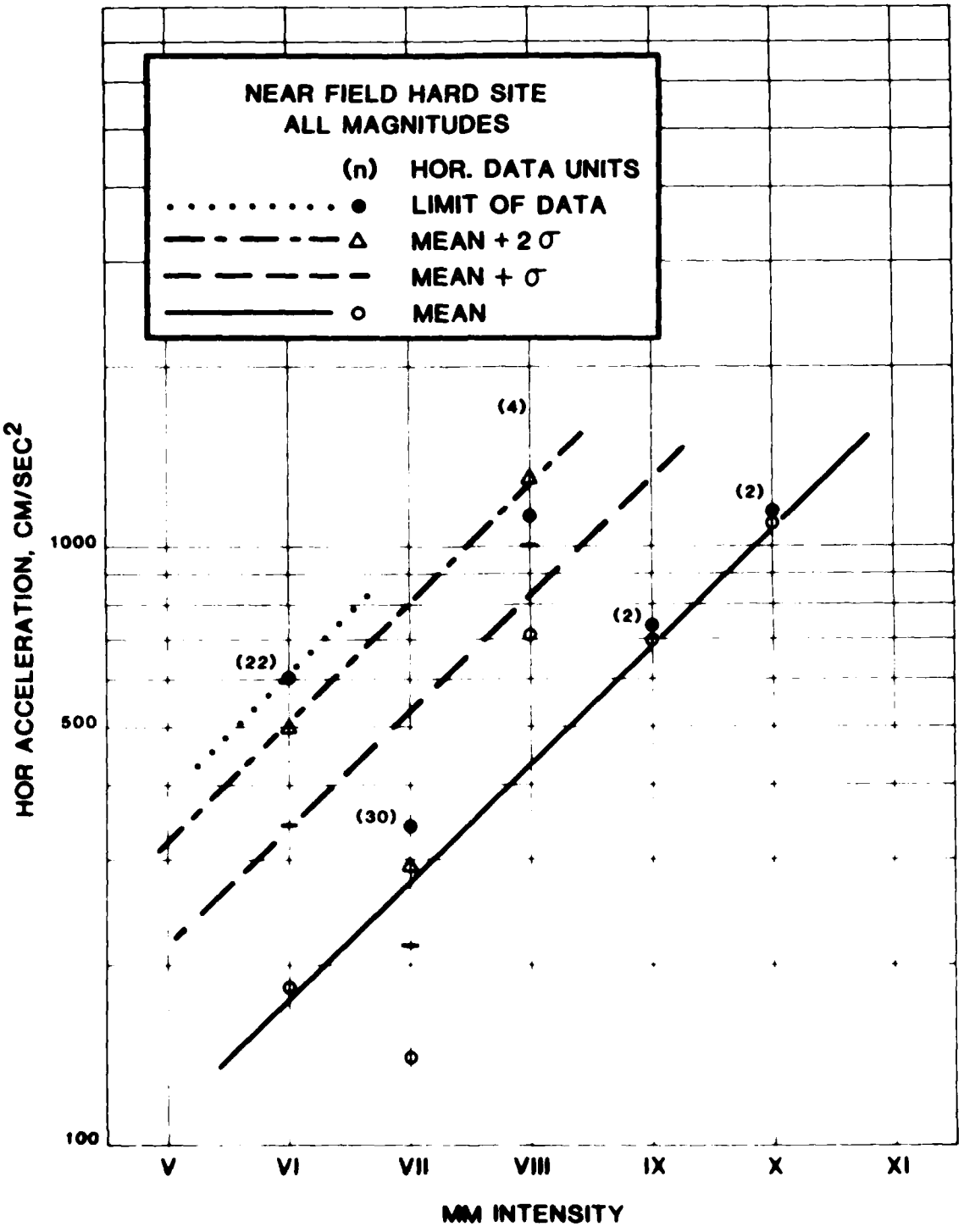


Figure 6. Chart 1

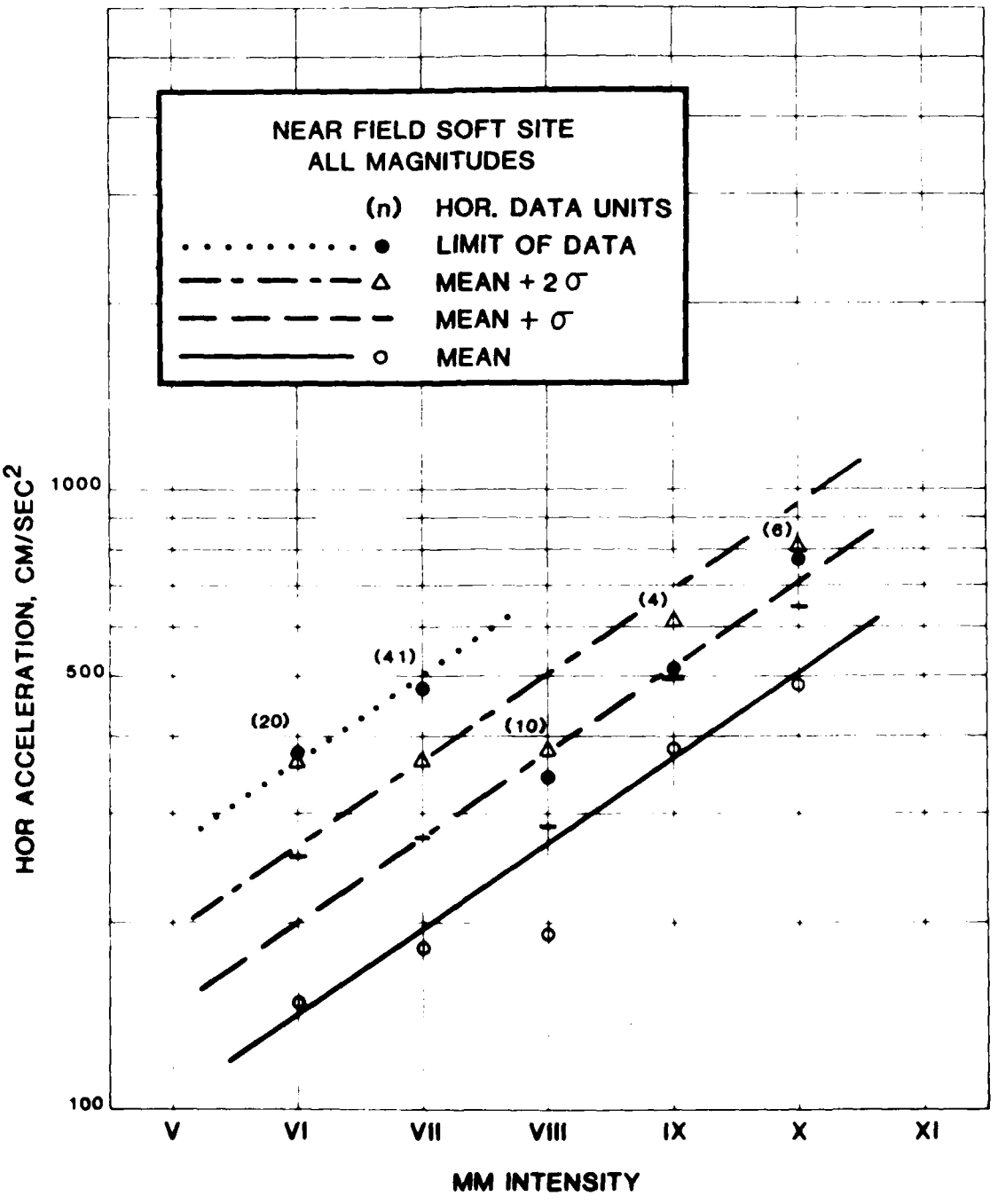


Figure 7. Chart 2

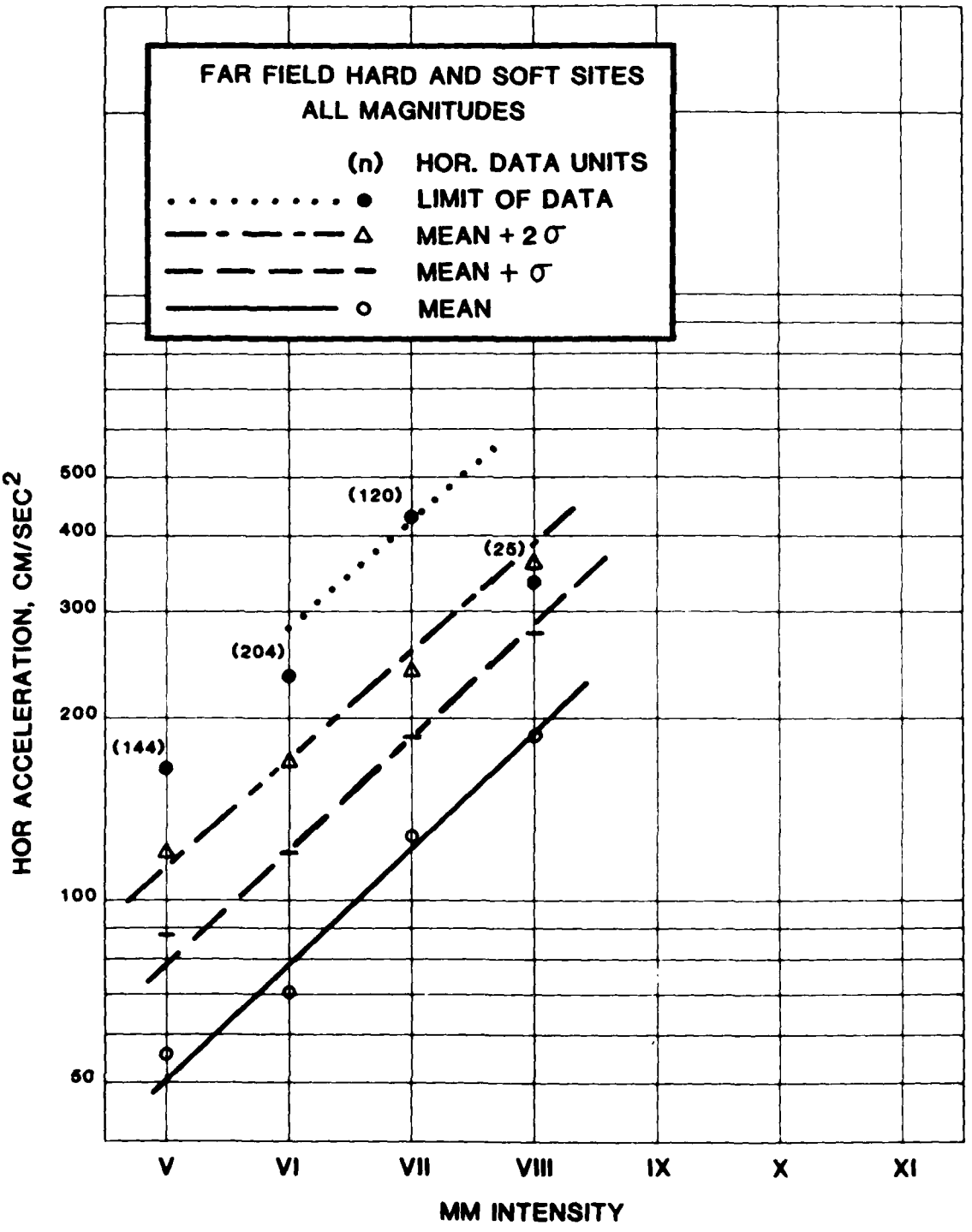


Figure 8. Chart 3

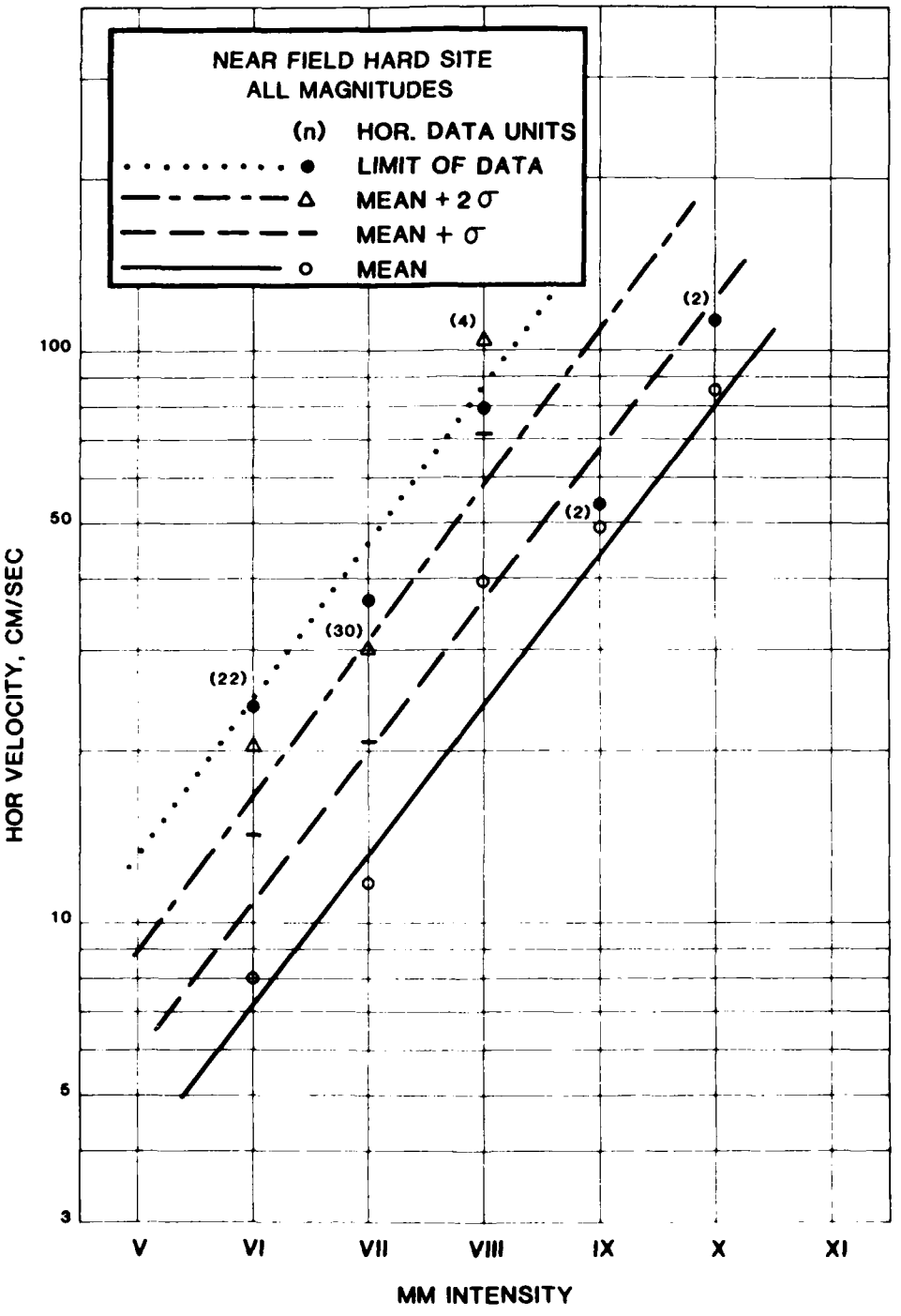


Figure 9. Chart 4

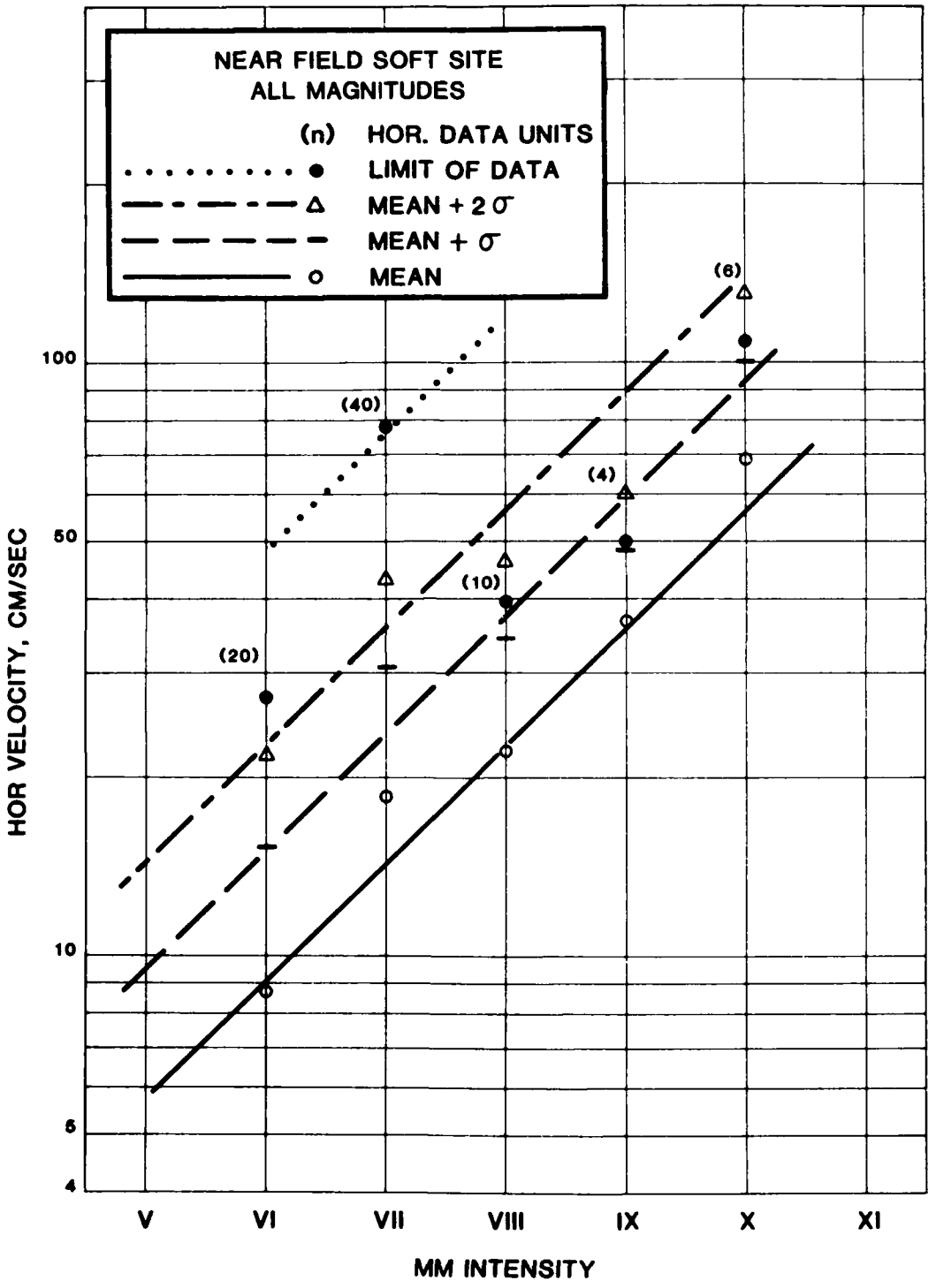


Figure 10. Chart 5

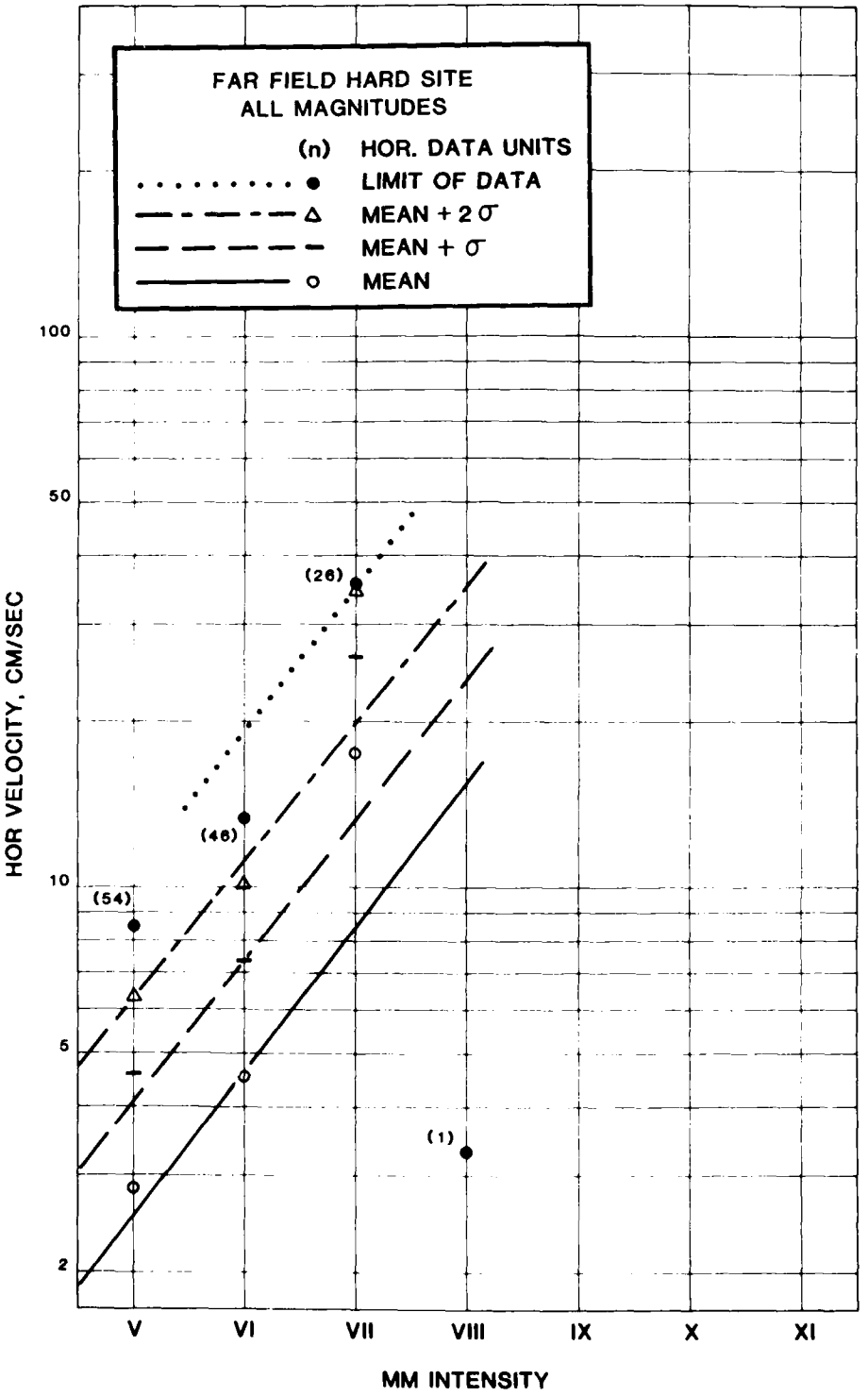


Figure 11. Chart 6

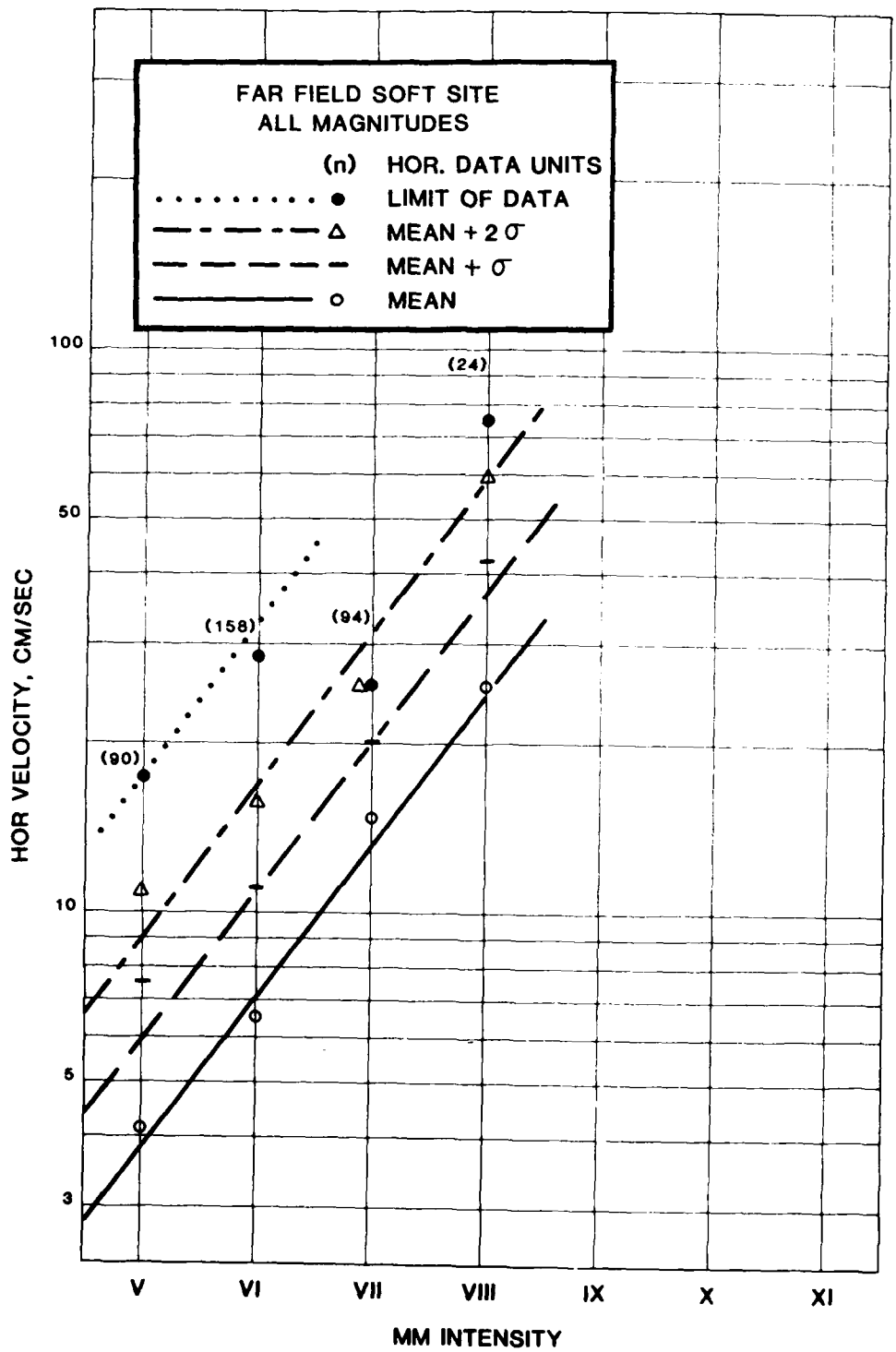


Figure 12. Chart 7

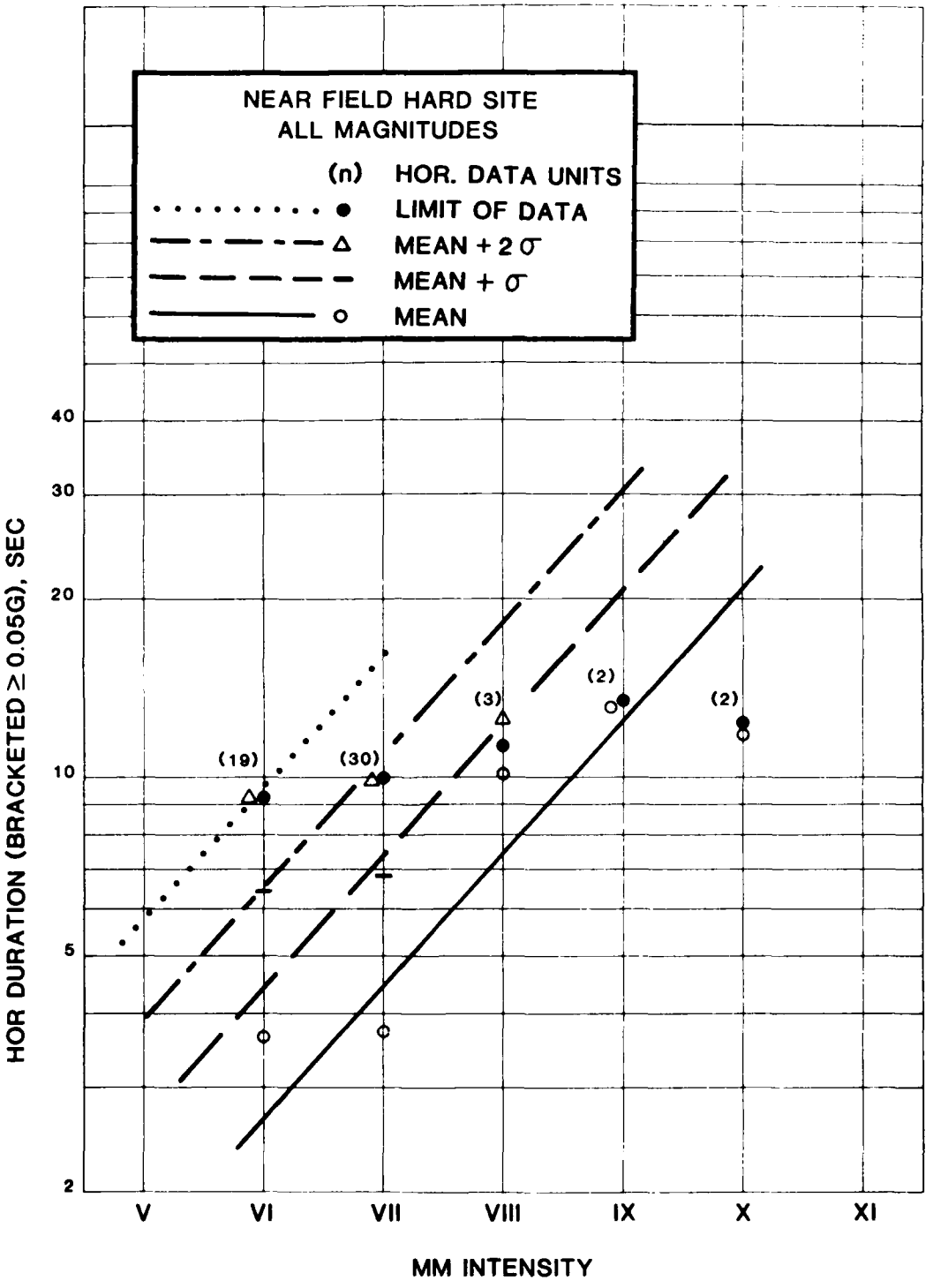


Figure 13. Chart 8

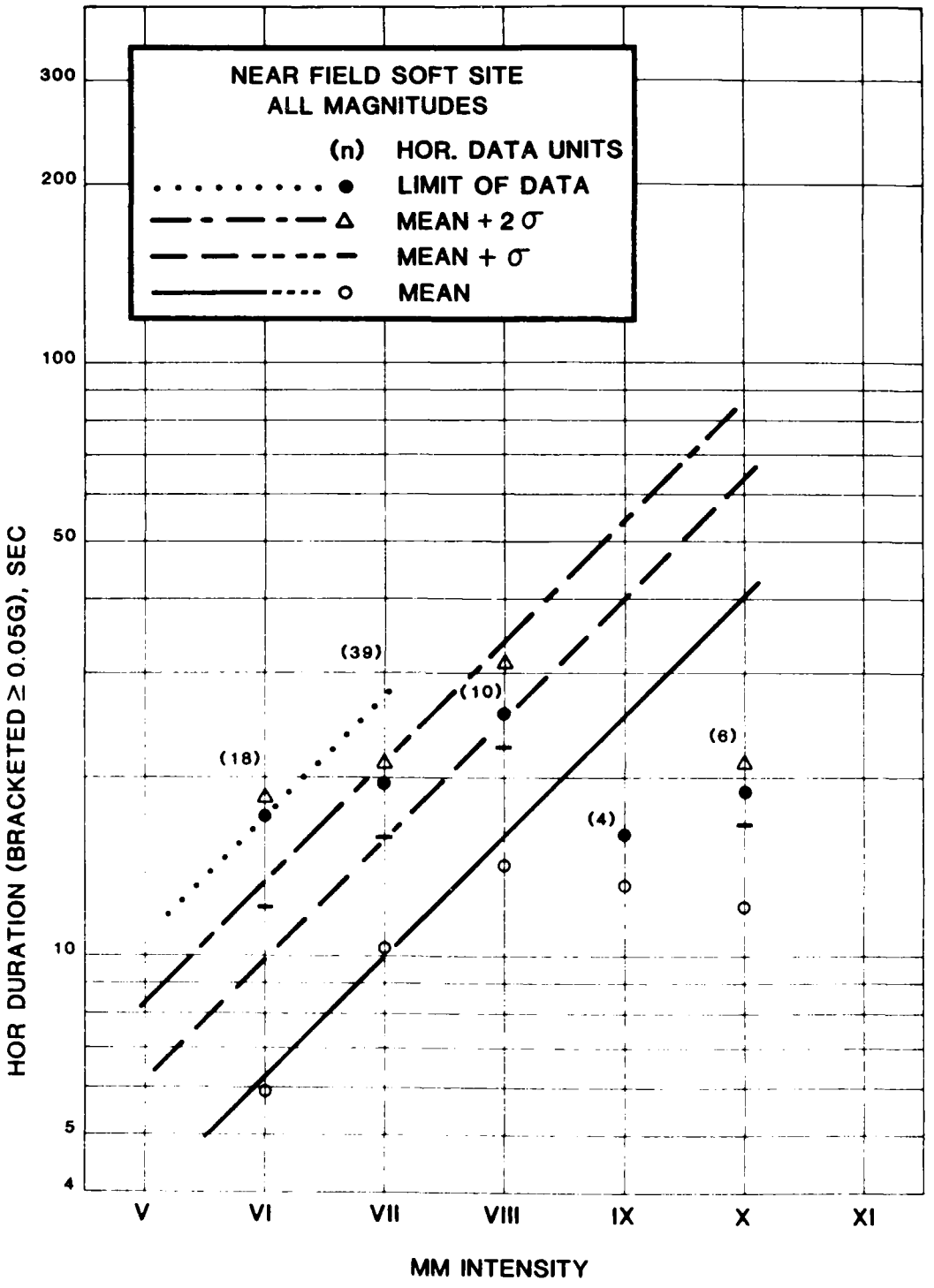


Figure 14. Chart 9

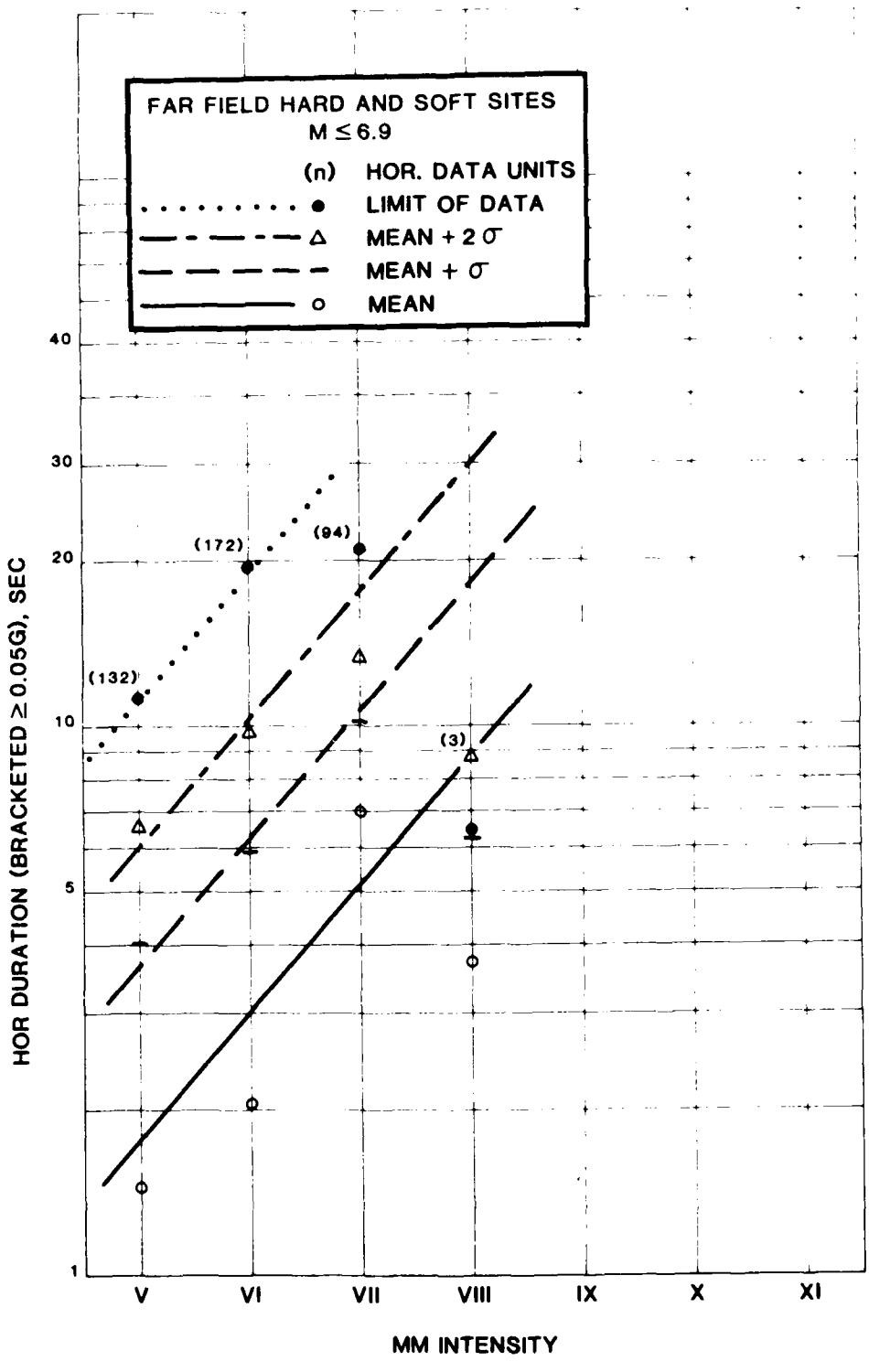


Figure 15. Chart 10

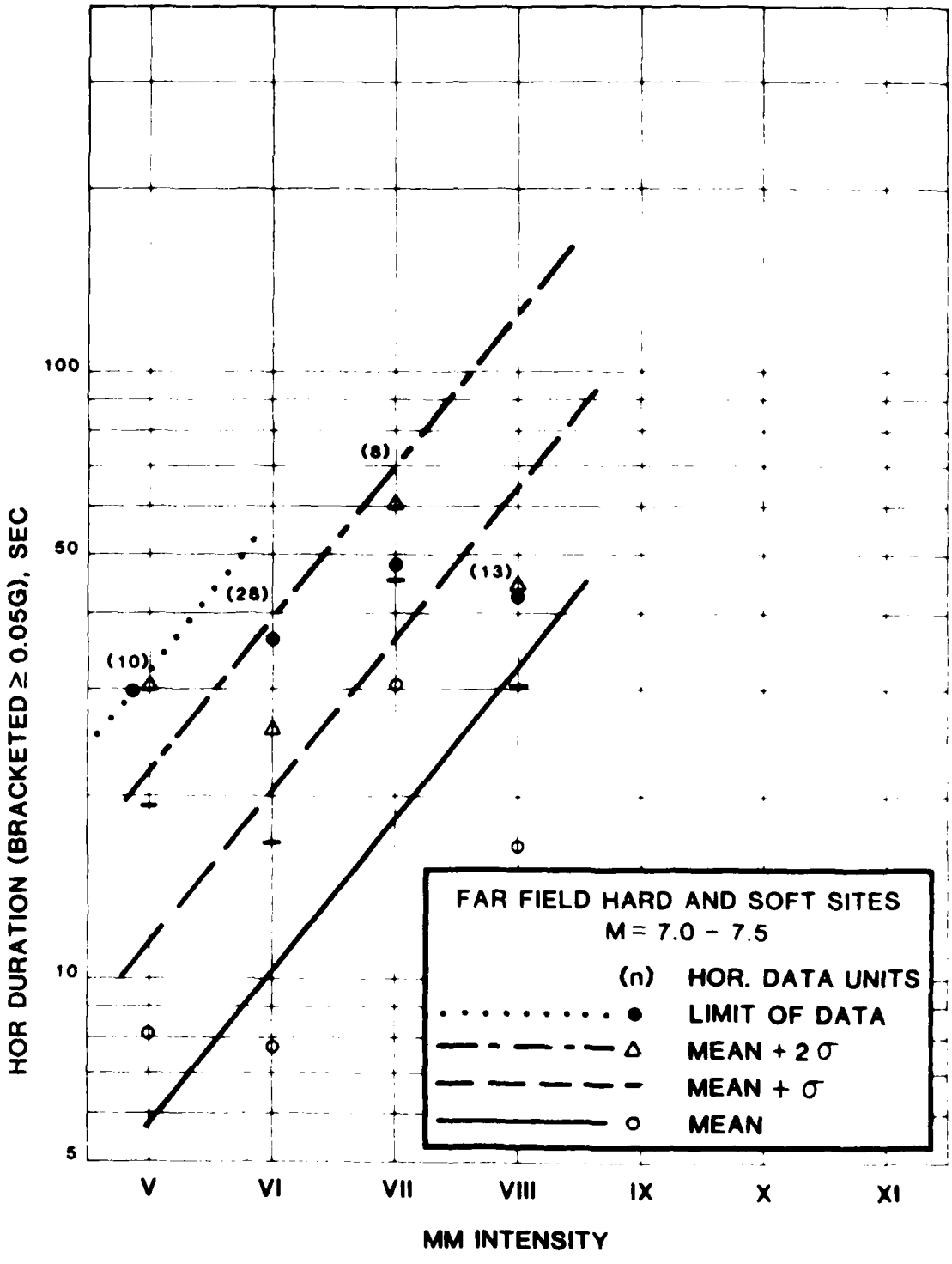


Figure 16. Chart 11

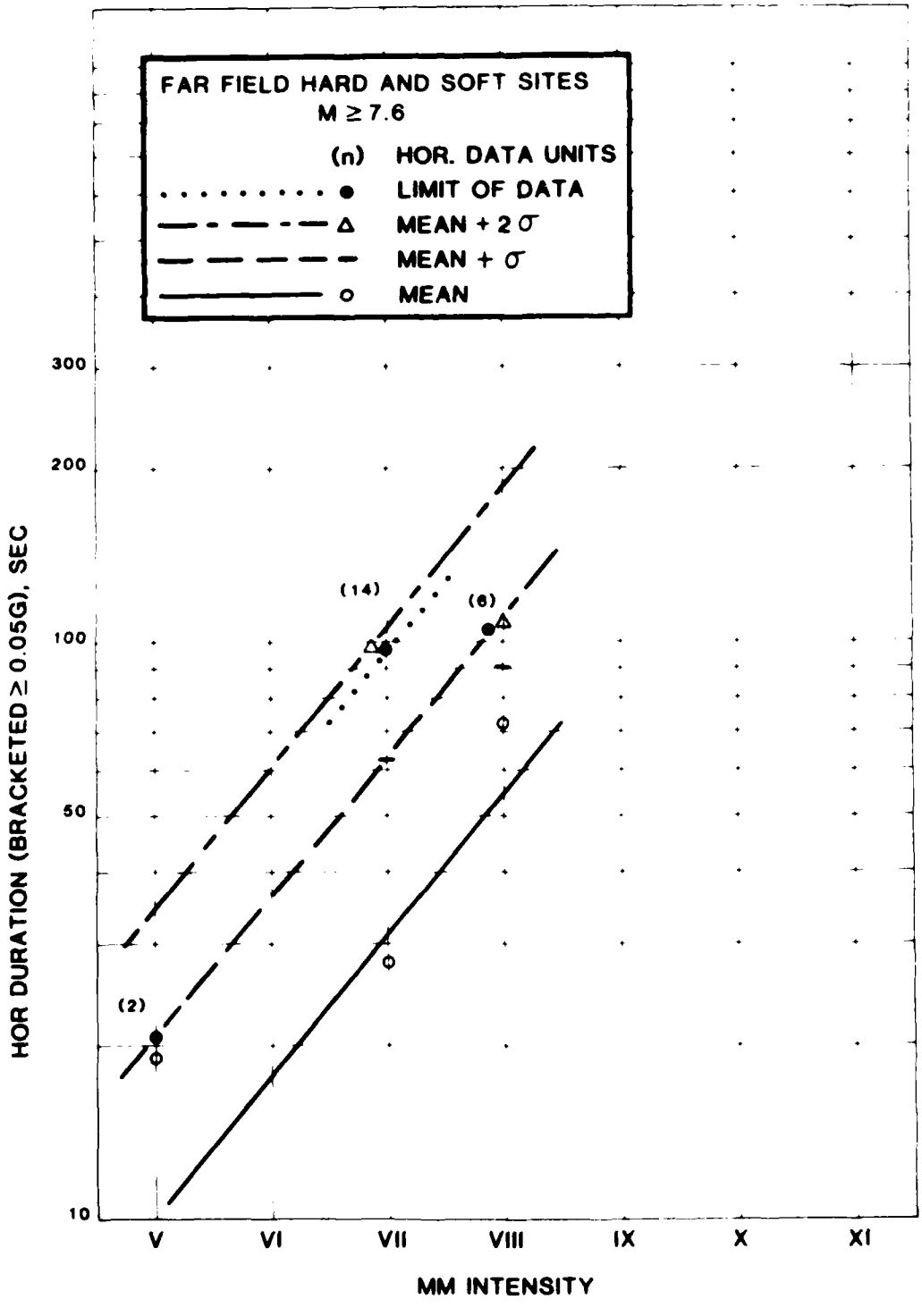


Figure 17. Chart 12

V. COMPARISON WITH PREVIOUS CHARTS

The relationships of the charts in this report, designated as Krinitzsky-Chang (1987) to representative earlier charts are shown in Figures 18 to 20.

Neumann (1954)

Probably the most influential of the early charts was the one produced by Neumann in 1954 (see Figure 18). His interpretation was based on only ten strong motion accelerograms. Neumann interpreted two curves, one for an epicentral distance of 15 miles or 25 km and another for 100 miles or 160 km (see Figure 18). His 25 km value at MM X is equivalent to the near field, hard site value in this report. At MM VII to IX, his values cross those of soft sites and far field in this report. For lower intensities, his values are all lower than the values in this report.

Neumann had no control on the spread in his data and offered no interpretation of velocity or duration.

Trifunac and Brady (1975)

Trifunac and Brady (1975) utilized a data base of 187 strong motion accelerograms from the western United States. Interestingly, they produced an acceleration curve (Figure 18) that is nearly identical to that of Neumann at 25 km.

Trifunac and Brady were able to use their larger data collection to determine standard deviations and they presented values for velocity and displacement but not for duration. They also presented comparisons for horizontal and vertical values, and for rock compared with alluvium. Their work however is difficult to compare to the results in this report because the present distinction of near field and far field has no equivalent in their work.

However, as with the Neumann curve, the Trifunac and Brady mean acceleration agrees with the near field hard site value in this report at MM X. The near field soft site in this report is about half. At the lower range, at MM VI and below, the values in this report are all higher.

Murphy and O'Brien (1977)

Murphy and O'Brien (1977) used a still larger data collection of 1500 strong motion accelerograms from all over the world. Figure 18 shows that their mean acceleration curve closely relates to those of Neumann and Trifunac and Brady at MM intensities of VIII and higher. However, Murphy and O'Brien noted that peak motions related to intensity are a function of earthquake magnitude and epicentral distance. They noted also that there were geographical differences in the data: southern Europe provided higher peak accelerations for given intensities than either Japan or the western United States. The cause was not determinable.

Again, the Murphy and O'Brien curves do not compare readily with those in this study because of the separations here into near field and far field as well as hard and soft sites.

Krinitzsky and Chang (1983)

The present charts are an update and expansion of the charts previously published by Krinitzsky and Chang (see Krinitzsky and Marcuson, 1983) and are meant to replace those charts.

The charts published in 1983 employed near field and far field, hard and soft sites and used divisions between $M \leq 6.9$ and $M \geq 7.0$ in the far field. There were 18 categories for which sets of curves were made. The present set has combined several of the categories, where the differences were less than one standard deviation, for a total of 12. These 12 charts include three

levels of earthquake magnitude that result in marked differences in duration: $M \le 6.4$, $M = 7.0$ to 7.5, and $M \ge 7.6$.

The relation between acceleration in this study and those of [illegible] (1977) for near field motions at hard and [illegible] sites [illegible] Figure 19. The present mean [illegible] [illegible] 1977 values except at MM X. [illegible] peak [illegible] recorded during recent [illegible] earthquakes [illegible] with [illegible] of data for this category. [illegible] higher, markedly so in the upper values for intensity [illegible] greater at MM X. Again, the changes have resulted [illegible] with high motions in a category where the data are sparse.

The relation between present accelerations and [illegible] 1977 [illegible] far field is shown in Figure 20. Essentially [illegible] MM intensities VII and VIII. For lower intensities the present [illegible] higher peak values based on more extensive data.

Figure 21 shows comparison for velocities in this study and in 1977 for near field, hard and soft sites and Figure 22 shows comparisons for the far field. In the near field, some values have risen in the low intensities but for higher intensities, MM VIII to X, the values are the same or lower. For the far field, values are significantly lower for both hard and soft sites.

Duration cannot be compared readily because of changes in the intervals that are used.

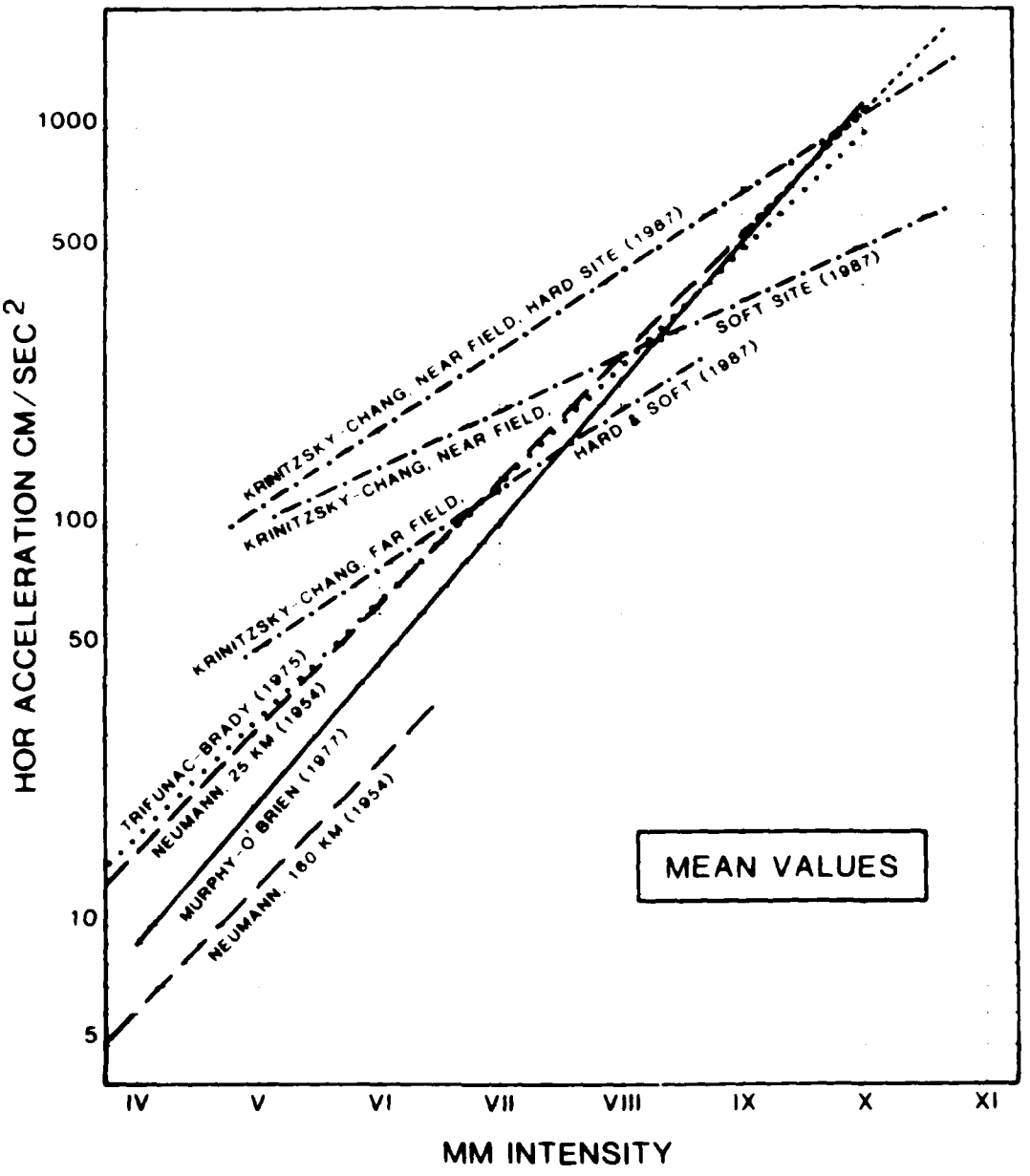


Figure 18. Comparison of present Krinitzsky-Chang (1987) curves for rock sites with representative curves by others

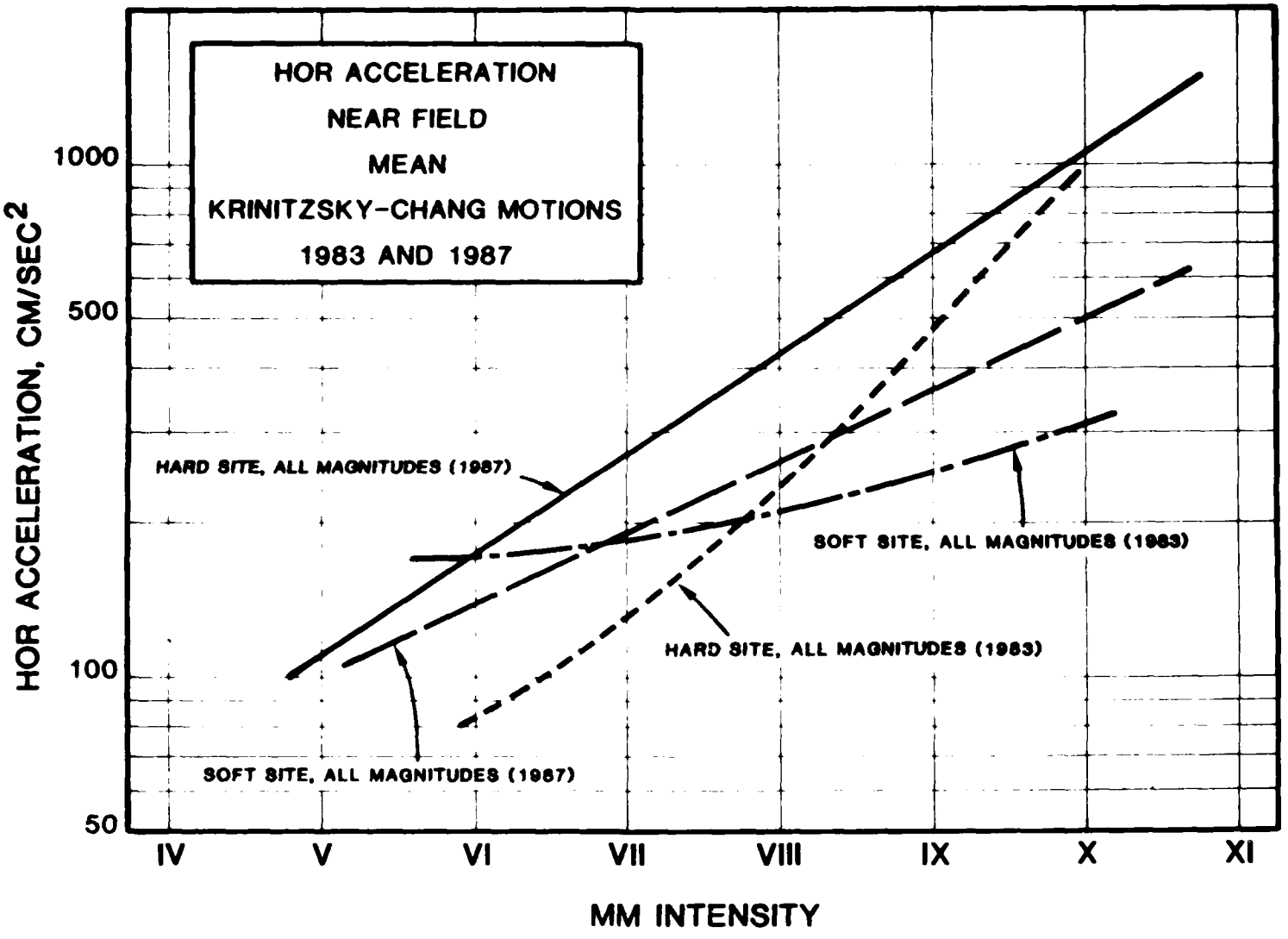


Figure 19. Comparison of present Krinitzsky-Chang (1987) curves for acceleration in the near field with Krinitzsky-Chang curves of 1983

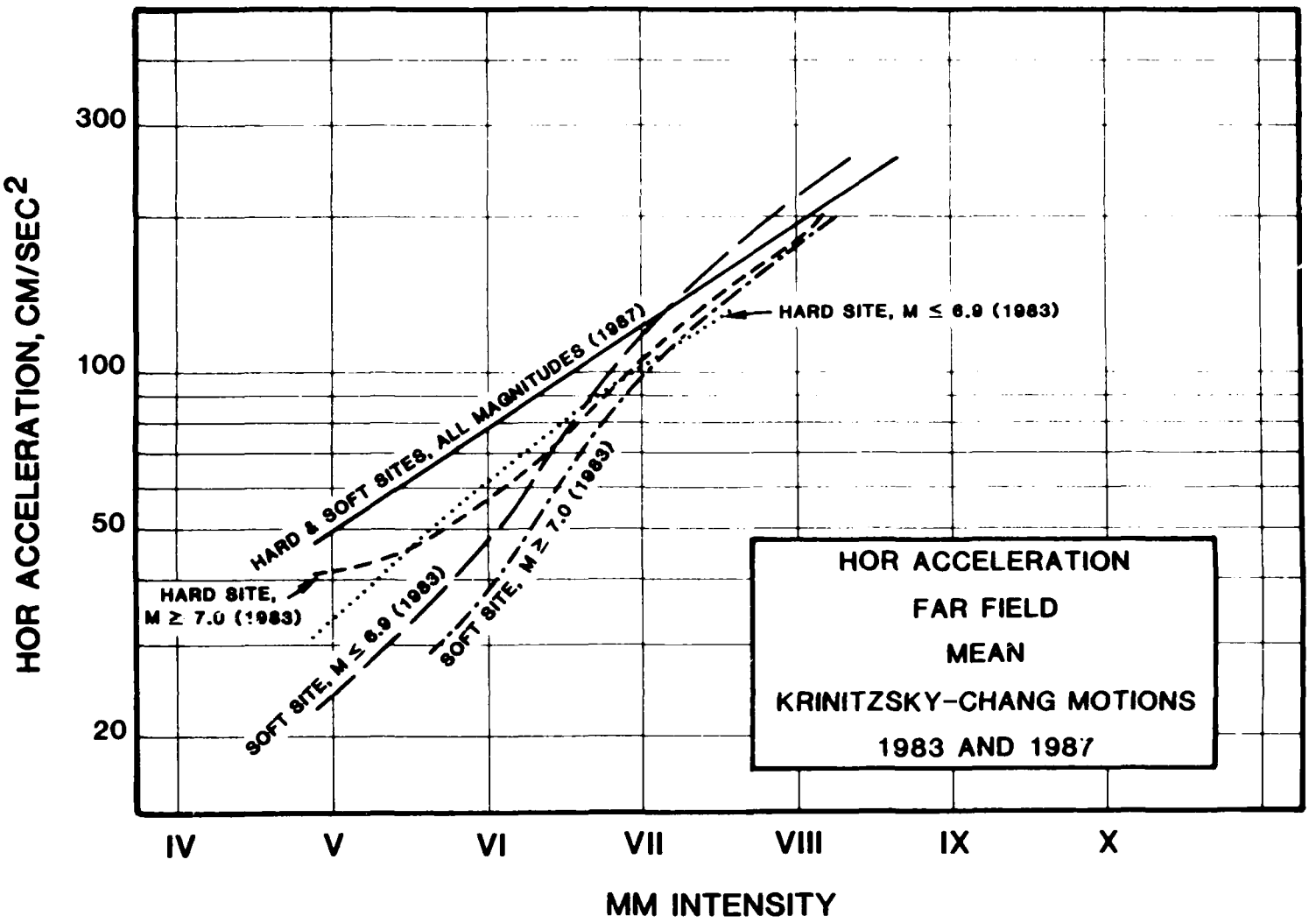


Figure 20. Comparison of present Krinitzsky-Chang (1987) curves for acceleration in the far field with Krinitzsky-Chang curves of 1983

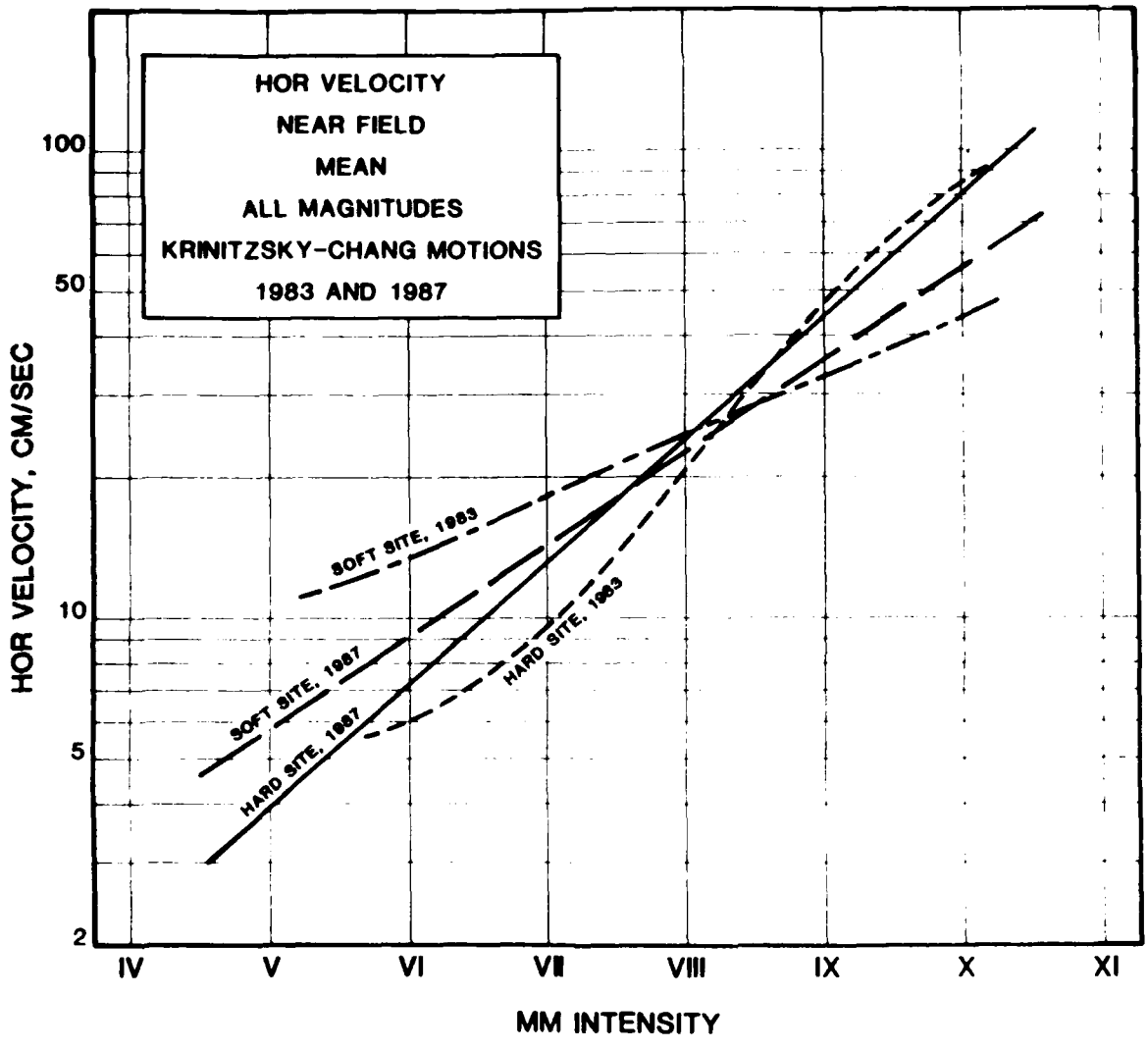


Figure 21. Comparison of present Krinitzsky-Chang (1987) curves for velocity in the near field with Krinitzsky-Chang curves of 1983

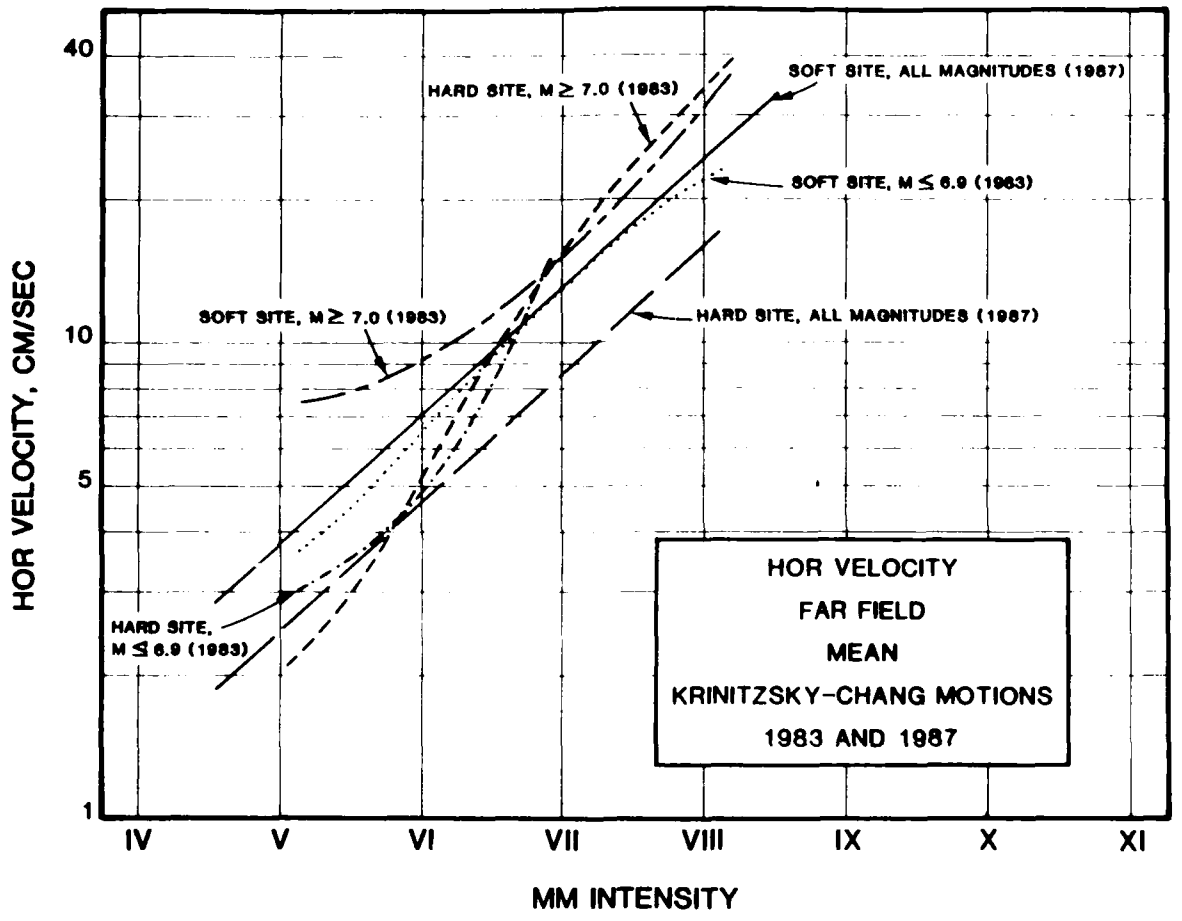


Figure 22. Comparison of present Krinitzsky-Chang (1987) curves for velocity in the far field with Krinitzsky-Chang curves of 1983

VI. USE OF THE EARTHQUAKE MOTION CHARTS

The first step toward using the charts in this report is to locate the source or sources of earthquakes and to interpret the maximum earthquake events (maximum credible earthquakes) that may reasonably be expected from these sources.

A flow chart for specifying Krinitzsky-Chang MM intensity-related motions is shown in Figure 23. The steps in this chart are applicable for all earthquake sources, whether they are faults or earthquake zones. An earthquake zone is an area over which a floating earthquake is moved.

Note that one begins with the background information: geology, geophysics and seismic history. Under these headings are included all categories of relevant data that may bear on present-day tectonism. The objective is to define the earthquake sources, whether they be capable faults or earthquake zones. Next, certain judgements must be made. Has the largest earthquake already occurred? If it has not, then fault dimensions can be used to estimate this earthquake. If there is no fault information, or the information is incomplete, the seismic history is the basis for interpretation. If there have been earthquakes, the area can be zoned as susceptible. The largest historic earthquake can be used as the maximum credible event or the earthquake can be raised an intensity unit or more. The decision is in all cases a matter of judgement. Next, one determines if the earthquake sources are near field or far field, measured by the sizes of the earthquakes and the distances from source to site. If the source is near field and is a hot spot, meaning a localized area where the seismicity is anomalously high compared with the surrounding region (Examples: New Madrid, MO; Ossipee, NH; Cape Ann, MA; Moodus, CT; Giles County, VA; Charleston, SC), then near field charts are

used for assigning motions. If the source is near field in distance but not a hot spot, far field charts are used for assigning motions. Outside of the areas of capable fault sources and hot spots, seismic zones are broader, have much lower levels of earthquake events and the activity is dispersed over large areas. Consequently, the floating earthquakes are both small and are unlikely to occur at or close to an engineering site. If they do occur near a site, the focal depths and small sizes of earthquakes would contribute to giving them far field characteristics. Thus, far field motions are appropriate for these floating earthquakes. Also, the far field motions may need to be attenuated for diminution over distance when brought from a source to a site.

By using the Krinitzsky-Chang charts, suitable parameters of peak motions may be obtained that are relatable to the spread in the data for any one set of conditions. A caution is that the large motions at MM IX and X for the near field are derived from very little data. Also, the curves need not project still higher to MM XI, at least not in the trends that are shown. To obtain a near field MM XI, some far field motions should be added to the selected near field time history to accomodate the shaking from fault propagation from the near field into the far field.

The peak motions may then be used to select accelerograms or to synthesize them. One should try to produce records that represent analogous relationships to a site, such as similarity of fault source, focal depth, distance of transmission, site condition, etc. Scaling should be limited to 2X or less in order not to affect the spectral content (see Vanmarcke, 1979). The duration should not be scaled as the spectral content

will be affected. Portions of the record can be repeated or deleted to accomodate the time interval. Where it is desired to test at the fundamental period of a structure, accelerograms can be selected or produced that have the parameters developed above but also have the predominant period that is desired. Then response spectra can be derived from the time histories.

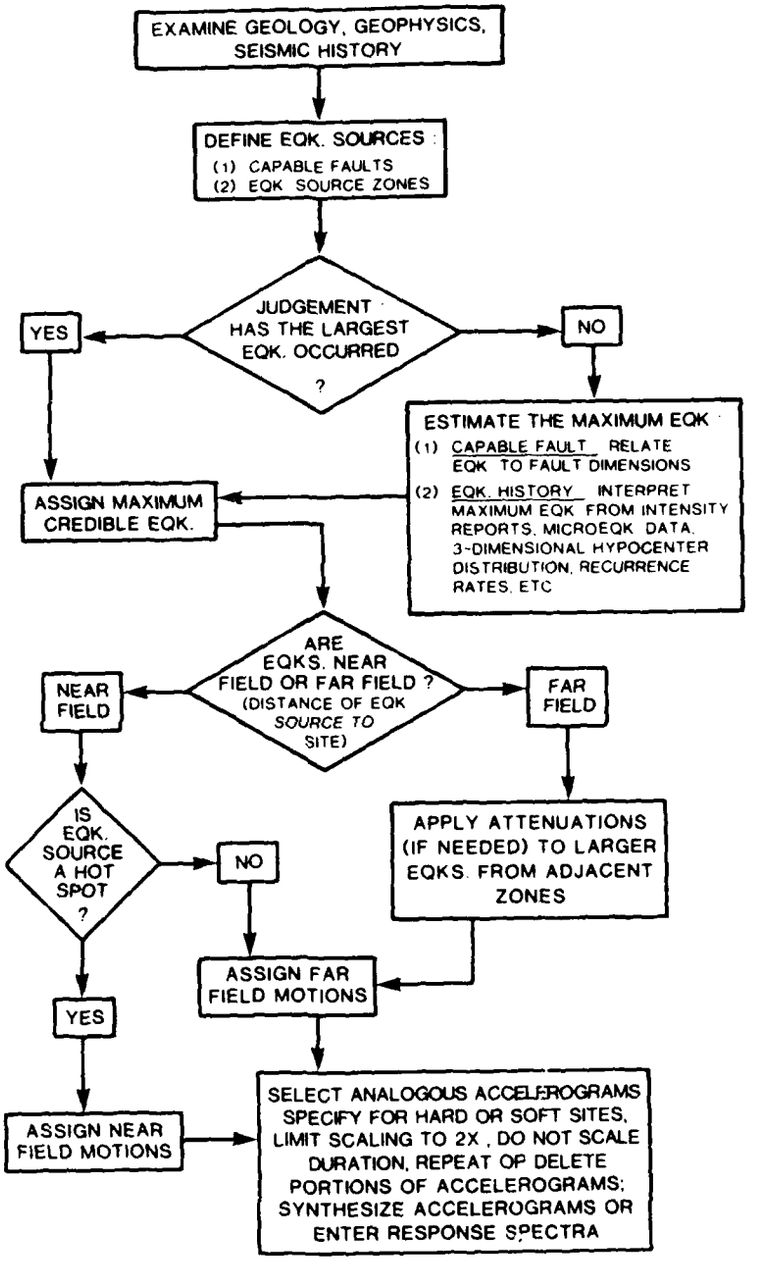


Figure 23. Flow Chart to obtain Krinitzsky-Chang MM intensity-related motions for all areas

VII. CONCLUSIONS

A set of twelve charts were developed that relate peak horizontal acceleration, velocity and duration to Modified Mercalli intensity. These charts also distinguish near field and far field conditions, hard and soft sites and sizes of earthquakes where these factors are significant. Charts were combined where differences between them were less than one standard deviation. The spread in the data is indicated by the mean, mean + S.D., mean + 2 S.D., and the highest observed values. Calculations are provided that relate vertical to horizontal motions and that present predominant periods for horizontal and vertical motions.

These charts are intended for use both where there are identifiable fault sources and where causative faults cannot be located. However, the procedure is best for those extensive areas in the United States where earthquakes occur but causative faults are unknown. The procedure provides parameters for either selecting or creating time histories to be used in dynamic analyses.

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APPENDIX A: STRONG-MOTION DATA

NOTE: Site Classification

1 = Rock 2 = Stiff soil	H = Hard
3 = Deep cohesionless soil ≥16 m 4 = Soft to medium stiff clay ≥16 m	S = Soft

Boundary between Hard and Soft: shear wave velocity of 400 m/sec

Distance to Source (km): The Distance to Source is Epicentral Distance for Japanese data; Focal Distance for all other data.

C.I.T. Cat.: California Institute of Technology catalogue number, "Strong Motion Earthquake Accelerograms; Corrected Accelerograms and Integrated Ground Velocities and Displacements," Vol 2, Parts A-N, 1971-75, Pasadena, CA.

MODIFIED MERCALLI INTENSITY VI

NEAR FIELD

HARD SITE

Earthquake	Site Classification	Mag M_S	Focal Depth km	Distance to Source km	Hor Accl cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec >.05g	Vert Accel cm/sec^2
Ofunato-Bochi	1H	6.2	40	25.6	49.7	1.2	0.1	0.	28.1
1970-09-14					75.6	5.6	6.0	0.91	
C.I.T. Cat.:									
E081	1H	6.6	13	35.4	213.0	9.9	7.0	8.48	63.7
					198.3	6.2	4.6	3.48	
J141	1H	6.6	13	32.3	145.5	18.0	3.4	3.54	93.0
					108.9	14.4	2.9	5.14	
J142	1H	6.6	13	29.8	168.2	5.3	1.2	4.94	150.8
					143.5	8.6	1.7	4.32	
J143	1H	6.6	13	29.6	119.3	4.8	2.0	4.50	71.5
					109.4	4.3	2.4	2.82	
0207	1H	6.6	13	35.3	64.6	3.84	1.23	*	32.90
					97.0	8.35	1.71	*	
U297	1H	5.0	5	7.6	74.80	3.22	0.84	0.42	31.70
					83.00	3.88	0.99	*	
W334	2H	5.4	9	16.1	139.00	8.87	2.21	(2.80)	53.00
					194.00	9.63	1.03	(2.08)	
Melendy Ranch	1H	4.7	10	10.8	486.2	21.8		3.12	144.3
1972-09-04					601.8	24.0		4.56	
Franklin Falls	1H	4.8	8	11.3	287.70	2.68		0.59	172.89
Dam Abut.					539.96	5.59		0.45	
1-18-82									
Morgan Hill,									
Gilroy #1									
Gavilan Coll.	H	6.2	9	40.02	93.3	2.66	0.48	9.3	84.1
Water Tank					57.5	2.52	0.30	8.3	
4-24-84									

* = No data

( ) = WES recalculated value

	Hor Accel cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur sec >.05g	Vert Accel cm/sec^2	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel
Data Units	22	22	18	19	11		11	
Mean	184.10	7.97	2.23	3.67	84.18	0.46	4.11	0.51
S.D.	157.85	6.29	1.93	2.76	51.07	0.32	3.06	0.49
Mean + S.D.	341.95	14.26	4.16	6.44	135.25	0.39	7.18	0.50
Mean + 2 S.D.	499.80	20.55	6.09	9.21	186.32	0.37	10.24	0.50

MODIFIED MERCALLI INTENSITY VI

NEAR FIELD

HARD SITE

Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec >.05g	Vert Accel cm/sec²	Vert Vel cm/sec	Vert Displ cm	Vert Dur Sec >.05g	Hor Predom Period sec	Vert Predom Period sec	Type of Fault	Epicenter Location	JMI
1.2	0.1	0.	28.1	0.9	0.1	0.	0.16	0.20	Thrust	38.9° Lat.	
5.6	6.0	0.91					0.47			142.0° Long.	
9.9	7.0	8.48	63.7	4.5	2.8	0.36	0.29	0.44	Thrust	34°24' N	
6.2	4.6	3.48					0.20			118°23.7' W	
18.0	3.4	3.54	93.0	11.7	2.9	5.96	0.38	0.29	Thrust	34°24'42" N	
14.4	2.9	5.14					0.83			118°24'00" W	
5.3	1.2	4.94	150.8	6.8	1.9	4.82	0.20	0.18	Thrust	34°24'42" N	
8.6	1.7	4.32					0.38			118°24'00" W	
4.8	2.0	4.50	71.5	2.9	2.2	2.68	0.25	0.35	Thrust	34°24'42" N	
4.3	2.4	2.82					0.25			118°24'00" W	
3.84	1.23	*	32.90	3.37	1.73	0.0	0.37	0.64	Thrust	34°24'42" N	
8.35	1.71	*					0.54			118°24'00" W	
3.22	0.84	0.42	41.70	1.42	0.28	0.0	0.22	0.28		46°37'00" N	
3.88	0.99	*					0.29			111°58'00" W	
8.87	2.21	(2.80)	54.00	3.18	1.44		0.40	0.37		34°16'12" N	
9.63	1.03	(2.08)					0.31			117°32'24" W	
21.8		3.21	144.3	5.6					Strike-slip		
24.0		4.55									
2.68		0.59	172.89	1.84					Thrust		
5.59		0.45									
2.66	0.48	9.3	84.1	3.01	0.41	7.3			Strike-slip	37.317° N	
2.52	0.30	8.3								121.680° W	

ec²	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel	Vert Displ cm	Ratio V/H Displ	Vert Dur sec >.05g	Ratio V/H Dur	Hor Predom Period sec	Vert Predom Period sec	Ratio V/H Predom Period
		11		9		8		16	8	
.39	0.46	4.11	0.51	1.55	0.69	2.69	0.73	0.37	0.41	1.11
	0.32	3.06	0.49	0.99	0.51	2.97	1.08	0.20	0.21	1.05
	0.39	7.18	0.50	2.54	0.61	5.66	0.88	0.52	0.61	1.07
.57	0.37	10.24	0.50	3.53	0.58	8.64	0.94	0.77	0.82	1.06

MODIFIED MERCA[illegible] I[illegible]NTENSITY [illegible]

NEAR [illegible]

[illegible]

Earthquake	Site Classification	Ma[illegible]	[illegible] Depth km	Distance to Source km	Hor Accel cm/sec²	Hor Vel cm/sec	Hor Displ cm	[illegible]	[illegible]ert Accel cm/sec²	Vert Vel cm/sec
Wakayama-II-S 1968-03-30	[illegible]S	[illegible]	[illegible]	[illegible]	[illegible]	6.[illegible]	[illegible]	[illegible]		
					14[illegible]	[illegible]	[illegible].1	[illegible]		
C.I.T. Cat.:										
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
					265.[illegible]	[illegible]	9.[illegible]	[illegible]		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3.[illegible]	[illegible]	[illegible]	[illegible]
					1[illegible]	9.[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1.[illegible]	[illegible]	[illegible]	[illegible]
					[illegible]	[illegible]	8.[illegible]	[illegible]		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	30.[illegible]	[illegible]	[illegible].95	[illegible]	[illegible]	[illegible]
					[illegible].50	[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	6[illegible].50	4.60	[illegible].06	*	56.40	[illegible]
					[illegible]	5.16	2.19	*		
[illegible]	[illegible]	[illegible]			39.70	[illegible].61	[illegible]	[illegible]	[illegible]	[illegible]
					53.60	9.3[illegible]	3.56	[illegible]		
[illegible]	[illegible]	[illegible]			[illegible]63.[illegible]	1[illegible].40	[illegible].02	[illegible]	[illegible]	1.[illegible]
					86.80	8.85	2.61	[illegible]		
Franklin Falls Dam downstream 1-18-82	[illegible]	[illegible]	[illegible]	[illegible]	140.[illegible]	2.03		[illegible]	[illegible]1.00	[illegible]
					3[illegible].86	2.8[illegible]		[illegible]		
Morgan Hill, Gilroy, Gavilan College, 4-24-84	[illegible]	[illegible]	[illegible]	[illegible]	95.0	3.39	0.4[illegible]	[illegible]	[illegible]	3.[illegible]
					85.9	2.45	0.36	8.[illegible]		

* = No data

( ) = WES recalculated value

	Hor Accel cm/sec²	Hor Vel cm/sec	Hor Displ cm	Hor Dur sec [illegible].05g	Vert Accel cm/sec²	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel
Data Units	20	20	18	18	9		9	
Mean	148.56	8.74	2.95	5.91	92.30	0.62	3.16	0.36
S.D.	108.41	6.61	2.53	6.23	83.20	0.7[illegible]	2.35	0.35
Mean + S.D.	256.97	15.36	5.48	12.14	175.49	0.68	5.51	0.36
Mean + 2 S.D.	365.38	21.97	8.02	18.37	258.69	0.71	7.86	0.36

MODIFIED MERCALLI INTENSITY VI

NEAR FIELD

SOFT SITE

[illegible] sec	Hor Displ cm	Hor Dur Sec >.05g	Vert Accel cm/sec	Vert Vel cm/sec	Vert Displ cm	Vert Dur Sec >.05g	Hor Predom Period sec	Vert Predom Period sec	Type of Fault	Epicenter Location	JMI
[illegible]	0.6	1.61					0.25			34.2° Lat.	
[illegible]	1.1	3.13					0.20			135.1° Long.	
[illegible]	4.2	13.78	153.3	6.2	14.0	7.42	0.33	0.25	Thrust	34°24' N	
[illegible]	9.3	17.24					0.64			118°23.7' W	
[illegible]	3.8	10.88	80.6	7.6	2.4	5.46	0.80	0.55	Thrust	34°24'42" N	
[illegible]	2.7	11.44					0.43			118°24'00" W	
[illegible]	1.8	14.04	105.3	4.1	3.3	3.66	0.27	0.24	Thrust	34°24'42" N	
[illegible]	8.9	14.00					0.28			118°24'00" W	
[illegible]	1.95	0.0	13.20	1.21	0.89	0.	0.62	0.57		32°59'00" N	
[illegible]	1.00	0.0					0.71			115°44'00" W	
[illegible]	2.06	*	56.40	1.54	0.62		0.46	0.17	Strike-	33°00'00" N	
[illegible]	2.19	*					0.46		slip	115°30'30" W	
[illegible]	2.47	0.0	8.47	1.04	0.56	0.0	1.20	0.27		33°47' N	
[illegible]	3.56	(0.12)					1.09			118°15' W	
[illegible]	4.02	(0.52)	24.70	1.93	0.48	0.0	0.69	0.49		34°07'06" N	
[illegible]	2.61	(0.44)					0.64			119°13'12" W	
[illegible]		1.07	271.00	1.73					Thrust		
[illegible]		1.18									
[illegible]	0.47	8.8	111.7	3.06	0.34	6.4			Strike-	37.317° N	
[illegible]	0.36	8.2							slip	121.680° W	

[illegible] sec	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel	Vert Displ cm	Ratio V/H Displ	Vert Dur sec >.05g	Ratio V/H Dur	Hor Predom Period sec	Vert Predom Period sec	Ratio V/H Predom Period
		9		8		7		16	7	
[illegible]	0.62	3.16	0.36	2.82	0.95	3.28	0.55	0.57	0.43	0.75
[illegible]	0.77	2.35	0.35	4.64	1.83	3.27	0.52	0.29	0.22	0.76
[illegible]	0.68	5.51	0.36	7.46	1.36	6.54	0.54	0.86	0.65	0.75
[illegible]	0.71	7.86	0.36	12.10	1.51	9.81	0.53	1.15	0.87	0.76

MODIFIED MERCALLI INTENSITY VII

NEAR FIELD

HARD SITE

Earthquake	Site Classification	Mag M_S	Focal Depth km	Distance to Source km	Hor Accel cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel cm/sec^2	Vert Vel cm/sec
C.I.T. Cat.:										
A008	2H	6.5	16	28.8	164.5	31.6	12.4	3.80	81.3	8.2
					252.7	29.4	14.1	6.02		
A013	2H	5.3	11	20.1	45.9	2.9	1.1	0	26.8	1.5
					44.9	5.0	1.4	0		
A014	2H	5.3	11	18.8	41.8	2.9	1.3	0	30.0	1.3
					45.4	2.1	1.0	0		
A015	1H	5.3	11	16.1	81.8	4.9	2.3	0.28	37.2	1.2
					102.8	4.6	0.8	1.30		
A016	2H	5.3	11	18.3	83.8	5.1	1.1	0.30	43.5	8.3
					55.1	4.0	0.9	1.26		
B025	1H	6.0	8	10.4	143.5	7.3	1.4	1.46	87.5	9.5
					142.5	13.3	3.7	1.30		
G106	1H	6.6	13	38.4	87.5	5.8	1.6	4.20	83.5	5.7
					188.6	11.6	5.0	5.88		
L166	2H	6.6	13	33.4	164.2	12.3	4.9	5.42	69.7	5.0
					147.6	15.0	5.4	5.36		
0198	1H	6.6	13	36.4	176.0	20.5	7.28	6.60	120.0	7.42
					167.0	14.5	5.45	8.34		
P214	2H	6.6	13	38.5	154.00	23.20	8.02	6.12	115.00	9.84
					156.00	16.20	7.94	5.74		
U295	1H				29.30	0.54	0.32	0.	7.11	0.52
					25.20	0.39	0.16	0.		
U300	2H	6.4			118.00	6.92	2.95	(2.66)	37.50	2.56
					113.00	5.74	2.51	(2.64)		
B037	1H	5.6	8.6	32.2	264.3	14.5	4.7	2.90	129.8	4.4
					340.8	22.5	5.5	2.08		
Oroville, CA 1975-8-1	1H	5.7	8	14.4	81.50	5.00		1.40	117.00	5.30
					90.90	4.50		1.60		
Morgan Hill, Gilroy #7, Mantelli Ranch 4-24-84	H	6.2	9	39.05	111.5	5.76	0.61	7.8	380.2	4.41
					183.0	6.64	0.59	9.9		
Morgan Hill, Gilroy #6, San Ysidro 4-24-84	H	6.2	9	38.08	280.4	36.6	5.24	10.0	409.2	14.5
					214.8	11.3	1.81	7.6		

( ) = WES recalculated value

	Hor Accel cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur sec ≥ .05g	Vert Accel cm/sec^2	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel	Vert Displ cm
Data Units	32	32	30	32	16		16		15
Mean	134.32	11.02	3.72	3.50	110.96	0.83	5.60	0.51	1.90
S.D.	77.95	9.34	3.51	3.15	117.08	1.50	3.85	0.41	1.5
Mean + S.D.	212.27	20.36	7.23	6.65	228.04	1.07	9.46	0.46	3.4
Mean + 2 S.D.	290.23	29.70	10.74	9.80	345.12	1.19	13.31	0.45	4.9

MODIFIED MERCALLI INTENSITY VII

NEAR FIELD

HARD SITE

or el /sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel cm/sec^2	Vert Vel cm/sec	Vert Displ cm	Vert Dur Sec ≥ .05g	Hor Predom Period sec	Vert Predom Period sec	Type of Fault	Epicenter Location	JMI
1.6	12.4	3.80	81.3	8.2	4.7	0.80	1.21	0.63		32°38' N	
9.4	14.1	6.02					0.73			117°07' W	
2.9	1.1	0	26.8	1.5	0.9	0.0	0.40	0.35	Strike-	37°40' N	
5.0	1.4	0					0.70		slip	122°29' W	
2.9	1.3	0	30.0	1.3	0.4	0.0	0.44	0.27	Strike-	37°40' N	
2.1	1.0	0					0.29		slip	122°29' W	
4.9	2.3	0.28	37.2	1.2	0.7	0.0	0.38	0.20	Strike-	37°40' N	
4.6	0.8	1.30					0.28		slip	122°29' W	
5.1	1.1	0.30	43.5	8.3	0.6	0.0	0.38	0.33	Strike-	37°40' N	
4.0	0.9	1.26					0.46		slip	122°29' W	
7.3	1.4	1.46	87.5	9.5	2.8	0.48	0.32	0.68	Normal	46°37' N	
3.3	3.7	1.30					0.59			111°58' W	
5.8	1.6	4.20	83.5	5.7	2.3	2.12	0.42	0.43	Thrust	34°24'42" N	
3.6	5.0	5.88					0.39			118°24'00" W	
.3	4.9	5.42	69.7	5.0	2.4	6.14	0.47	0.45	Thrust	34°24' N	
.0	5.4	5.36					0.64			118°23'42" W	
.5	7.28	6.60	120.0	7.42	3.38	6.38	0.73	0.39	Thrust	34°24'42" N	
.5	5.45	8.34					0.54			118°24'00" W	
.20	8.02	6.12	115.00	9.84	5.15	6.62	0.95	0.54	Thrust	34°24'42" N	
.20	7.94	5.74					0.65			118°24'00" W	
.54	0.32	0.	7.11	0.52	0.67	0.0	0.12	0.46	Normal	46°37'00" N	
.39	0.16	0.					0.1			111°58'00" W	
.32	2.95	(2.66)	37.50	2.56	1.12	0.0	0.37	0.43		40°36' N	
.74	2.51	(2.64)					0.32			124°36' W	
.5	4.7	2.90	129.8	4.4	1.4	0.58	0.34	0.21	Strike-	35°54' N	
.5	5.5	2.08					0.41		slip	120°54' W	
.00		1.40	117.00	5.30					Normal		
.50		1.60									
5.16	0.61	7.8	380.2	4.41	0.40	2.3			Strike-	37.317° N	
.64	0.59	9.9							slip	121.680° W	
.6	5.24	10.0	409.2	14.5	1.65	5.6			Strike-	37.317° N	
.3	1.81	7.6							slip	121.680° W	

	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel	Vert Displ cm	Ratio V/H Displ	Vert Dur sec ≥ .05g	Ratio V/H Dur	Hor Predom Period sec	Vert Predom Period sec	Ratio V/H Predom Period
		16		15		15		26	13	
	0.83	5.60	0.51	1.90	0.51	2.07	0.59	0.48	0.41	0.85
	1.50	3.85	0.41	1.53	0.43	2.68	0.85	0.24	0.15	0.62
	1.07	9.46	0.46	3.44	0.47	4.75	0.71	0.73	0.56	0.77
	1.19	13.31	0.45	4.97	0.46	7.42	0.76	0.97	0.71	0.73

MODIFIED MERCALLI INTENSITY VII

NEAR FIELD

SOFT SITE

Earthquake	Site Classification	Mag M_S	Focal Depth km	Distance to Source km	Hor Accel cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel cm/sec^2	Ver Ve cm/
Chiba-S	4S	6.1	73	75.6	161.2	11.2	1.1	4.08	40.5	2.
1980-09-25					99.7	11.8	2.0	2.38		
C.I.T. Cat.:										
A004	3S	7.7	16	45.9	152.7		6.7	19.50	102.9	6.
					175.9	17.7	9.2	15.12		
A010	3S	5.5	16	18.8	100.2	10.8	2.8	0.82	44.2	1.
					105.8	4.4	1.7	0.42		
B033	3S	5.6	8.6	33.0	479.6	77.9	26.3	11.74	202.2	14.
B034	3S	5.6	8.6	33.5	347.8	22.5	5.2	6.64	116.9	6.
					425.7	25.4	7.1	7.30		
B035	3S	5.6	8.6	35.2	232.6	10.8	4.4	7.84	77.7	4.
					269.6	11.8	3.9	5.70		
C048	3S	6.6	13	25.9	250.0	30.0	14.9	17.22	167.5	32.
					131.7	23.9	13.8	17.82		
D068	3S	6.6	13	37.3	81.2	12.6	8.1	3.60	57.2	5.
					98.0	13.3	7.2	3.84		
F088	3S	6.6	13	36.5	265.7	30.7	11.1	8.02	131.5	15.
					209.1	23.5	5.3	10.20		
G110	3S	6.6	13	34.1	207.8	13.4	5.0	5.60	126.3	5.
					139.0	9.0	2.9	5.88		
H115	3S	6.6	13	32.0	220.6	28.2	13.4	16.82	94.5	9.
					146.0	23.5	10.3	17.90		
I137	3S	6.6	13	31.8	140.2	16.1	7.1	19.50	99.9	7.
					129.0	22.3	8.4	16.12		
J145	3S	6.6	13	37.2	113.9	31.5	17.5	15.74	106.4	18.
					103.4	28.8	15.3	16.26		
Q233	3S	6.6	13	32.0	243.00	31.50	18.30	17.48	96.00	9.
					197.00	17.80	9.46	15.12		
Q236	3S	6.6	13	37.2	167.00	13.40	6.13	9.50	73.20	
					122.00	10.30	5.85	5.20		
R246	3S	6.6	13	38.0	115.00	16.70	8.29	9.04	74.10	
					106.00	18.30	10.40	10.72		
R248	3S	6.6	13	38.0	184.00	19.70	7.68	9.70	88.90	6.
					174.00	18.20	10.20	10.68		
B036	3S	5.6	8.6	37.5	52.1	7.0	4.1	*	44.6	5.
					63.2	8.0	5.7	*		
Morgan Hill, Gilroy #4 San Ysidro School 4-24-84	S	6.2	9	38.08	328.5	16.7	3.02	12.7	389.2	11.
					217.4	19.2	2.99	13.7		
Morgan Hill, Gilroy #3 Sewage Pl. 4-24-84	S	6.2	9	40.02	189.8	11.9	2.58	12.8	355.5	8.
					177.0	11.0	2.47	7.3		
Morgan Hill, Gilroy #2 Hwy 101 Motel 4-24-84	S	6.2	9	40.02	210.0	12.5	1.98	7.4	424.2	9.
					153.7	4.99	1.12	8.1		

* = No data

MODIFIED MERCALLI INTENSITY VII

NEAR FIELD

SOFT SITE

Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel cm/sec^2	Vert Vel cm/sec	Vert Displ cm	Vert Dur Sec ≥ .05g	Hor Predom Period sec	Vert Predom Period sec	Type of Fault	Epicenter Location	JMI
11.2	1.1	4.08	40.5	2.4	0.2	0.	0.44	0.37		35.5°Lat.N	
11.8	2.0	2.38					0.74			140.2°Long.E	
	6.7	19.50	102.9	6.7	5.0	13.54	0.65	0.41	Thrust	35°00' N	
17.7	9.2	15.12					0.63			119°02' W	
10.8	2.8	0.82	44.2	1.2	1.2	0.0	0.68	0.17		37°22' N	
4.4	1.7	0.42					0.26			121°53' W	
77.9	26.3	11.74	202.2	14.1	4.3	6.90	1.02	0.44	Strike-	35°54' N	
									slip	120°54' W	
										120°54' W	
22.5	5.2	6.64	116.9	6.8	3.4	7.32	0.41	0.37	Strike-	35°54' N	
25.4	7.1	7.30					0.37		slip	120°54' W	
10.8	4.4	7.84	77.7	4.5	2.1	3.94	0.29	0.36	Strike-	35°54' N	
11.8	3.9	5.70					0.28		slip	120°54' W	
30.0	14.9	17.22	167.5	32.0	14.6	22.22	0.75	1.20	Thrust	34°24' N	
33.9	13.8	17.82					1.14			118°23'42" W	
12.6	8.1	3.60	57.2	5.6	4.2		0.97	0.62	Thrust	34°24' N	
13.3	7.2	3.84					0.85			118°23.7' W	
30.7	11.1	8.02	131.5	15.6	5.6	9.62	0.73	0.74	Thrust	34°24' N	
23.5	5.3	10.20					0.71			118°23.7' W	
13.4	5.0	5.60	126.3	5.7	2.6	4.60	0.41	0.28	Thrust	34°24'42" N	
9.0	2.9	5.88					0.41			118°24'00" W	
28.2	13.4	16.82	94.5	9.3	4.3	9.34	0.80	0.62	Thrust	34°24'42" N	
23.5	10.3	17.90					1.01			118°24'00" W	
16.1	7.1	19.50	99.9	7.9	2.6	10.20	0.72	0.49	Thrust	34°24'42" N	
22.3	8.4	16.12					1.08			118°24'00" W	
31.5	17.5	15.74	106.4	18.1	7.0	21.60	1.73	1.07	Thrust	34°24' N	
28.8	15.3	16.26					1.75			118°23'42" W	
31.50	18.30	17.48	96.00	9.65	3.82	7.54	0.81	0.63	Thrust	34°24'42" N	
17.80	9.46	15.12					0.57			118°24'00" W	
13.40	6.13	9.50	73.20	7.49	1.87	5.36	0.50	0.64	Thrust	34°24'42" N	
10.30	5.85	5.20					0.53			118°24'00" W	
16.70	8.29	9.04	74.10	7.07	1.99	5.20	0.91	0.60	Thrust	34°24'42" N	
18.30	10.40	10.72					1.08			118°24'00" W	
19.70	7.68	9.70	88.90	6.33	2.76	10.28	0.67	0.45	Thrust	34°24'42" N	
18.20	10.20	10.68					0.65			118°24'00" W	
7.0	4.1	*	44.6	5.0	2.6	0.0	0.84	0.70	Strike-	35°54' N	
8.0	5.7	*					0.79		slip	120°54' W	
16.7	3.02	12.7	389.2	11.0	1.76	5.7			Strike-	37.317° N	
19.2	2.99	13.7							slip	121.680° W	
11.9	2.58	12.8	355.5	8.97	1.14	3.4			Strike-	37.317° N	
11.0	2.47	7.3							slip	121.680° W	
12.5	1.98	7.4	424.2	9.66	0.95	5.6			Strike-	37.317° N	
4.99	1.12	8.1							slip	121.680° W	

MODIFIED MERCALLI INTENSITY VII (Conclud

NEAR FIELD

SOFT SITE

	Hor Accel $_2$ cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur sec > .05g	Vert Accel $_2$ cm/sec^2	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel
Data Units	41	41	41	39	21		21	
Mean	182.59	18.63	7.58	10.40	138.73	0.76	9.29	0.50
S.D.	91.18	12.06	5.42	5.43	112.50	1.23	6.60	0.55
Mean + S.D.	273.76	30.70	13.00	15.82	251.24	0.92	15.89	0.52
Mean + 2 S.D.	364.94	42.76	18.42	21.25	363.74	1.00	22.50	0.53

MODIFIED MERCALLI INTENSITY VII (Concluded)

NEAR FIELD

SOFT SITE

ert Accel $\frac{cm}{sec^2}$	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel	Vert Displ cm	Ratio V/H Displ	Vert Dur sec > .05g	Ratio V/H Dur	Hor Predom Period sec	Vert Predom Period sec	Ratio V/H Predom Period
		21		21		20		35	18	
.73	0.76	9.29	0.50	3.52	0.46	7.64	0.73	0.75	0.56	0.75
.50	1.23	6.60	0.55	3.04	0.56	6.07	1.12	0.34	0.26	0.76
.24	0.92	15.89	0.52	6.56	0.50	13.72	0.87	1.09	0.82	0.75
.74	1.00	22.50	0.53	9.61	0.52	19.79	0.93	1.43	1.08	0.75

MODIFIED MERCALLI INTENSITY VIII

NEAR FIELD

HARD SITE

Earthquake	Site Classification	Mag M_S	Focal Depth km	Distance to Source km	Hor Accel$_2$ cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel$_2$ cm/sec^2
Koyna, India 12-10-67	1H	6.5	12	13.0	447.66 619.35	12.29 13.61		10.2	333.20
Morgan Hill, Coyote Lake Dam S. Abut. 4-24-84	H	6.2	9	26.57	1137.8 639.7	79.7 51.9	10.5 10.3	11.4 9.0	376.3

	Hor Accel$_2$ cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur sec ≥ .05g	Vert Accel$_2$ cm/sec^2	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel
Data Units	4	4	2	3	2		1	
Mean	711.13	39.37	10.4	10.2	354.75	0.50		
S.D.								
Mean + S.D.								
Mean + 2 S.D.								

MODIFIED MERCALLI INTENSITY VIII

NEAR FIELD

HARD SITE

Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel cm/sec^2	Vert Vel cm/sec	Vert Displ cm	Vert Dur Sec ≥ .05g	Hor Predom Period sec	Vert Predom Period sec	Type of Fault	Epicenter Location	JMI
12.29		10.2	333.20								
13.61											
79.7	10.5	11.4	376.3	15.4	2.7	6.4			Strike-	37.317° N	
51.9	10.3	9.0							slip	121.680° W	

...rt ...el, ...ec²	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel	Vert Displ cm	Ratio V/H Displ	Vert Dur sec ≥ .05g	Ratio V/H Dur	Hor Predom Period sec	Vert Predom Period sec	Ratio V/H Predom Period
		1		1		1				
..75	0.50									

MODIFIED MERCALLI INTENSITY VIII

NEAR FIELD

SOFT SITE

Earthquake	Site Classification	Mag M_S	Focal Depth km	Distance to Source km	Hor Accel$_2$ cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel$_2$ cm/sec^2	V V cm
C.I.T. Cat.:										
A001	3S	6.7	16	18.5	341.7	33.4	10.9	25.86	206.3	1
					210.1	36.9	19.8	25.40		
B029	3S	7.1	70	72.0	161.6	21.4	8.5	22.30	90.6	
					274.6	17.0	10.4	21.04		
U310	3S	6.5	57	61.2	52.10	5.59	2.55	(4.3)	32.10	
					77.50	9.35	5.43	(7.2)		
V315	3S	6.3	10	29.0	192.00	29.40	22.70	(6.6)	279.00	3
					155.00	16.50	11.80	(8.24)		
Morgan Hill Halls Valley 4-24-84	S	6.2	9	9.85	305.8	39.6	6.56	11.0	108.0	1
					153.0	12.6	1.75	10.6		

( ) = WES recalculated value

	Hor Accel$_2$ cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur sec ≥ .05g	Vert Accel$_2$ cm/sec^2	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel
Data Units	10	10	10	10	5		5	
Mean	192.34	22.17	10.04	14.25	143.2	0.74	13.61	0.61
S.D.	93.69	11.97	6.83	8.41				
Mean + S.D.	286.03	34.14	16.87	22.67				
Mean + 2 S.D.	379.73	46.11	23.70	31.08				

MODIFIED MERCALLI INTENSITY VIII

NEAR FIELD

SOFT SITE

Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel cm/sec^2	Vert Vel cm/sec	Vert Displ cm	Vert Dur Sec ≥ .05g	Hor Predom Period sec	Vert Predom Period sec	Type of Fault	Epicenter Location	JMI
33.4	10.9	25.86	206.3	10.8	5.6	13.26	0.61	0.33	Strike-	32°44' N	
36.9	19.8	25.40					1.10		slip	115°27' W	
21.4	8.5	22.30	90.6	6.8	4.0	18.36	0.83	0.47	Thrust	46°06' N	
17.0	10.4	21.04					0.39			122°42' W	
5.59	2.55	(4.3)	32.10	8.35	1.62	0.0	0.67	0.46	Normal	47°24' N	
9.35	5.43	(7.2)					0.76			122°18' W	
29.40	22.70	(6.6)	279.00	30.10	26.30		0.96	0.68	Strike-	33°37' N	
16.50	11.80	(8.24)					0.67		slip	117°58' W	
39.6	6.56	11.0	108.0	12.0	1.39	10.8			Strike-	37.317° N	
12.6	1.75	10.6							slip	121.680° W	

Vert Accel cm/sec^2	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel	Vert Displ cm	Ratio V/H Displ	Vert Dur sec ≥ .05g	Ratio V/H Dur	Hor Predom Period sec	Vert Predom Period sec	Ratio V/H Predom Period
5		5		5		4		8	4	
243.2	0.74	13.61	0.61	7.78	0.77	10.60	0.74	0.75	0.48	0.64
								0.22		
								0.97		
								1.19		

MODIFIED MERCALLI INTENSITY IX

NEAR FIELD

HARD SITE

Earthquake	Site Classification	Mag M_S	Focal Depth km	Distance to Source km	Hor Accel$_2$ cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel$_2$ cm/sec^2	V c
Karakyr Point, Gazli, USSR 5-17-76	1H	7.3	30	31.6	656.0 738.0	44.0 54.0		13.5 13.0	1327.45	

	Hor Accel$_2$ cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur sec ≥ .05g	Vert Accel$_2$ cm/sec^2	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel
Data Units	2	2		2	1		1	
Mean	697.0	49.0		13.25				
S.D.								
Mean + S.D.								
Mean + 2 S.D.								

MODIFIED MERCALLI INTENSITY IX

NEAR FIELD

HARD SITE

Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel cm/sec^2	Vert Vel cm/sec	Vert Displ cm	Vert Dur Sec ≥ .05g	Hor Predom Period sec	Vert Predom Period sec	Type of Fault	Epicenter Location	JMI
44.0		13.5	1327.45	69.65					Thrust		
54.0		13.0									

Vert Accel cm/sec^2	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel	Vert Displ cm	Ratio V/H Displ	Vert Dur sec ≥ .05g	Ratio V/H Dur	Hor Predom Period sec	Vert Predom Period sec	Ratio V/H Predom Period
1		1								

MODIFIED MERCALLI INTENSITY IX

NEAR FIELD

SOFT SITE

Earthquake	Site Classification	Mag M_S	Focal Depth km	Distance to Source km	Hor Accel cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec > .05g	Vert Accel cm/sec^2	Vert Vel cm/s
Coalinga, CA Pleasant Valley Pumping Plant (Basement) 5-2-83	S	6.6	10.5	13.83	267.28 306.69	21.71 36.74	3.86 10.54	12.6 9.6	216.26	15.
Coalinga, CA Pleasant Valley Pumping Plant (Switch Yard) 5-2-83	S	6.6	10.5	13.83	514.43 440.56	39.22 49.96	5.05 15.46	16.0 14.7	371.13	36.

	Hor Accel cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur sec > .05g	Vert Accel cm/sec^2	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel
Data Units	4	4	4	4	2		2	
Mean	382.24	36.91	8.73	13.22	293.69	0.77	15.96	0.43
S.D.								
Mean + S.D.								
Mean + 2 S.D.								

MODIFIED MERCALLI INTENSITY IX

NEAR FIELD

SOFT SITE

Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel cm/sec^2	Vert Vel cm/sec	Vert Displ cm	Vert Dur Sec ≥ .05g	Hor Predom Period sec	Vert Predom Period sec	Type of Fault	Station Location	JMI
21.71	3.86	12.6	216.26	15.53	7.94	11.8			Thrust	36.23°N	
36.74	10.54	9.6								120.29°W	
39.22	5.05	16.0	371.13	16.40	7.58	13.5			Thrust	36.23°N	
49.96	15.46	14.7								120.29°W	

rt el, sec^2	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel	Vert Displ cm	Ratio V/H Displ	Vert Dur sec ≥ .05g	Ratio V/H Dur	Hor Predom Period sec	Vert Predom Period sec	Ratio V/H Predom Period
		2		2		2				
.69	0.77	15.96	0.43	7.76	0.89	12.65	0.96			

MODIFIED MERCALLI INTENSITY X
NEAR FIELD
HARD SITE

Earthquake	Site Classification	Mag M_S	Focal Depth km	Distance to Source km	Hor Accel$_2$ cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec > .05g	Vert Accel$_2$ cm/sec^2	Vert Vel cm/s
C.I.T. Cat.:										
C041	1H	6.6	13	15.9	1148.1	113.2	37.7	11.36	696.0	58.
					1054.9	57.7	10.8	12.44		

	Hor Accel$_2$ cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur sec > .05g	Vert Accel$_2$ cm/sec^2	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel
Data Units	2	2	2	2	1		1	
Mean	1101.5	85.42	24.25	11.9				
S.D.								
Mean + S.D.								
Mean + 2 S.D.								

MODIFIED MERCALLI INTENSITY X

NEAR FIELD

HARD SITE

Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec > .05g	Vert Accel cm/sec^2	Vert Vel cm/sec	Vert Displ cm	Vert Dur Sec > .05g	Hor Predom Period sec	Vert Predom Period sec	Type of Fault	Epicenter Location	JMI
113.2	37.7	11.36	696.0	58.3	19.3	10.50	0.62	0.53	Thrust	34°24' N	
57.7	10.8	12.44					0.34			118°23'42" W	

Vert Accel cm/sec^2	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel	Vert Displ cm	Ratio V/H Displ	Vert Dur sec > .05g	Ratio V/H Dur	Hor Predom Period sec	Vert Predom Period sec	Ratio V/H Predom Period
		1		1		1		2	1	
								0.48		

MODIFIED MERCALLI INTENSITY X

NEAR FIELD

SOFT SITE

Earthquake	Site Classification	Mag M_S	Focal Depth km	Distance to Source km	Hor Accel$_2$ cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel$_2$ cm/sec^2	Vert Vel cm/sec
Bonds Corner Epic. Dist. 6Km (3Km From Fault)		6.5	12	13.4	770.4 575.7	44.07 43.63		18.87 16.02	347.7	12.17
Array No. 7 Epic. Dist. 26Km (1Km From Fault)		6.5	12	28.6	453.6 326.8	107.8 44.36		9.53 6.61	503.6	25.86
El Centro Sta 6 Huston Rd. Epic. Dist. 27Km (1Km From Fault)		6.5	12	29.5	428.1 368.7	108.7 63.13		10.40 11.87	1662.7	56.42

	Hor Accel$_2$ cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur sec ≥ .05g	Vert Accel$_2$ cm/sec^2	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel
Data Units	6	6	0	6	3		3	
Mean	487.22	68.61		12.22	838.0	1.72	31.48	0.46
S.D.	162.74	31.58		4.49				
Mean + S.D.	649.96	100.20		16.71				
Mean + 2 S.D.	812.70	131.78		21.20				

MODIFIED MERCALLI INTENSITY X

NEAR FIELD

SOFT SITE

Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel $_2$ cm/sec^2	Vert Vel cm/sec	Vert Displ cm	Vert Dur Sec ≥.05g	Hor Predom Period sec	Vert Predom Period sec	Type of Fault	Station Location	JMI
44.07 43.63		18.87 16.02	347.7	12.17		18.34			Strike-slip	32.69°N 115.34°W	
107.8 44.36		9.53 6.61	503.6	25.86		6.13			Strike-slip	32.83°W 115.50°W	
108.7 63.13		10.40 11.87	1662.7	56.42		8.00			Strike-slip	32.84°N 115.49°W	

ert cel, sec^2	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel	Vert Displ cm	Ratio V/H Displ	Vert Dur sec ≥ .05g	Ratio V/H Dur	Hor Predom Period sec	Vert Predom Period sec	Ratio V/H Predom Period
3		3		0		3		0	0	
+.0	1.72	31.48	0.46			10.82	0.88			

MODIFIED MERCALLI INTENSITY V

FAR FIELD

M = 6.9

HARD SITE

Earthquake	Site Classification	Mag M_S	Focal Depth km	Distance to Source km	Hor Accel$_2$ cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel$_2$ cm/sec^2	Vert Vel cm/s
C.I.T. Cat.:										
A002	2H	6.0	16	58.6	102.0	4.8	2.4	0.40	26.4	2.
					109.5	7.4	2.7	2.48		
B038	2H	5.6	8.6	76.6	14.2	1.1	1.2	0.0	6.1	1.
					11.4	0.8	0.6	0.0		
B039	2H	5.8	10-20		20.4	2.3	0.9	0.0	7.7	1.
					19.5	2.8	1.4	0.0		
B040	2H	6.5	20	135.9	40.0	3.7	1.6	0.0	54.2	3.
					45.5	4.2	2.9	0.0		
F102	1H	6.6	13	69.7	24.6	1.4	0.8	0.0	15.3	1.
					20.6	1.3	0.7	0.0		
F104	2H	6.6	13	53.8	85.2	8.5	2.6	6.00	35.5	3.
					103.1	6.0	2.3	1.80		
L171	2H	6.6	13	140.4	12.0	1.8	2.1	0.0	10.3	1.
					15.9	2.8	1.1	0.6		
M183	2H	6.6	13	72.0	42.4	3.8	1.2	0.0	22.9	2.
					55.7	3.6	0.9	0.0		
M184	2H	6.6	13	72.0	43.1	4.6	1.2	1.0	24.7	1.
					57.2	2.9	0.7	0.0		
P223	1H	6.6	13	66.3	69.70	4.60	2.07	0.42	37.80	2.
					53.20	4.39	1.55	0.02		
P298	2H				38.40	4.07	1.90	0.0	13.90	1.
					35.90	2.71	0.94	0.0		
V323	2H	4.4	11	19.1	15.60	0.82	0.2	0.0	5.80	0.
					18.50	0.98	0.32	0.0		
V331	2H	4.4			40.40	2.12	0.7	0.0	26.20	0.
					35.90	1.13	0.4	0.0		
W344	2H	5.4	8	59.6	14.40	1.03	1.03	0.0	15.40	1.
					24.10	2.00	2.37	0.0		
Kashima-S	2H	7.4	4	56.0	166.3	4.7	1.5	3.50		
1967-11-19					119.9	3.2	0.2	5.02		
Miyako-S	2H	5.9	60	156.7	65.4	1.7	0.3	0.45		
1968-05-17					75.3	2.4	0.4	0.90		
Miyako-S	2H	6.3	40	77.8	86.7	3.1	0.2	4.65		
1968-05-23					71.6	3.1	0.8	3.98		
Kashima-S	2H	6.1	70	116.4	45.1	2.3	0.2	0.		
1968-07-01					68.9	3.2	0.2	1.79		
Muroran-S	2H	6.9	40	158.0	68.8	2.9	0.3	6.86		
1968-09-21					38.0	1.3	0.0	0.		
Kashima-S	2H	5.3	40	41.8	93.8	2.9	0.2	1.55	25.5	0.
1971-06-13					77.2	2.4	0.2	1.90		
Miyako-S	2H	6.4	40	153.0	82.2	2.2	0.1	8.30		
1972-03-20					92.1	2.2	0.1	6.03		
Miyako-S	2H	4.4	80	31	58.6	1.6	0.1	0.19	21.0	0.
1976-07-22					36.7	1.0	0.1	0.		
Miyako-S	2H	5.8	70	145.8	53 3	1.6	0.0	0.51	14.1	0.
1977-06-08					62.2	1.4	0.0	0.87		
Miyako-S	2H	4.4	80	85.7	58.6	1.6	0.1	0.19	21.0	0.
1976-07-22					36.7	1.0	0.1	0.		

MODIFIED MERCALLI INTENSITY V

FAR FIELD

M = 6.9

HARD SITE

Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel cm/sec²	Vert Vel cm/sec	Vert Displ cm	Vert Dur Sec ≥ .05g	Hor Predom Period sec	Vert Predom Period sec	Type of Fault	Epicenter Location	JMI
4.8	2.4	0.40	26.4	2.2	1.6	0.0	0.30	0.52		40°17'N	
7.4	2.7	2.48					0.43			124°48'W	
1.1	1.2	0.0	6.1	1.3	0.9	0.0	0.49	1.34	Strike-	35°54'N	
0.8	0.6	0.0					0.44		slip	120°54'W	
2.3	0.9	0.0	7.7	1.5	1.3	0.0	0.71	1.22	Strike-	40°30'N	
2.8	1.4	0.0					0.90		slip	124°36'W	
3.7	1.6	0.0	54.2	3.5	1.7	0.0	0.58	0.41	Strike-	33°09'N	
4.2	2.9	0.0					0.58		slip	116°08'W	
1.4	0.8	0.0	15.3	1.0	0.5	0.0	0.36	0.41	Thrust	34°24'N	
1.3	0.7	0.0					0.39			118°23.7'W	
5.5	2.0	6.00	35.5	3.8	1.2	0.0	0.63	0.67	Thrust	34°24'N	
6.0	2.3	1.80					0.36			118°23.7'W	
1.8	2.1	0.0	10.3	1.5	2.0	0.0	0.94	0.91	Thrust	34°24'N	
1.8	2.1	0.0					1.11			118°23'42"W	
3.8	1.2	0.0	22.9	2.0	1.2	0.0	0.56	0.55	Thrust	34°24'N	
.6	0.9	0.0					0.29			118°23'42"W	
2.5	1.2	0.0	24.7	1.8	0.9	0.0	0.67	0.46	Thrust	34°24'N	
.9	0.7	0.0					0.32			118°23'42"W	
4.60	2.07	0.42	37.50	2.24	1.79	0.0	0.41	0.37	Thrust	34°24'42"N	
4.39	1.82	0.00					0.52			118°24'00"W	
2.07	0.90	0.0	24.94	1.59	1.04	0.0	0.66	0.72		40°30'00"N	
2.71	0.99	0.0					0.47			125°15'00"W	
1.82	0.26	0.0	5.50	0.88	0.86	0.0	0.33	0.95		37°39'00"N	
0.98	0.72	0.0					0.33			122°27'00"W	
2.12	0.87	0.0	26.20	0.58	0.18	0.0	0.33	1.24		34°29'06"N	
1.13	0.42	0.0					0.20			118°31'18"W	
3.03	1.03	0.0	35.20	1.86	1.44	0.0	0.45	0.76		34°16'12"N	
4.00	2.37	0.0					0.52			117°32'24"W	
.7	0.5	3.50					0.18		R. Dip-	36.3°Lat.	
5.2	0.2	5.03					0.17		slip	141.1°Long.	
1.7	0.1	0.45					0.16		R. Dip-	40.8°Lat.	
2.4	0.4	0.90					0.20		slip	143.0°Long.	
2.1	0.1	4.65					0.16		R. Dip-	40.2°Lat.	
2.1	0.8	3.98					0.18		slip	142.5°Long.	
2.3	0.2	0.					0.31		R. Dip-	36.0°Lat	
3.2	0.2	1.79					0.29		slip	139.4°Long.	
2.9	0.3	6.86					0.27		R. Dip-	41.0°Lat.	
1.3	0.0	0.					0.22		slip	142.8°Long.	
2.9	0.2	1.55	25.5	0.7	0.0	0.	0.19	0.18	R. Dip-	36.2°Lat.	
2.4	0.2	1.90					0.19		slip	141.0°Long.	
2.2	0.1	8.30					0.17		N.Strike-	41.0°Lat.	
2.2	0.1	6.03					0.15		slip	141.8°Long.	
1.6	0.1	0.19	21.0	0.5	0.0	0.	0.17	0.14		39.9°Lat.	
1.0	0.1	0.					0.17			141.9°Long.	
1.6	0.0	0.51	14.1	0.3	0.0	0.	0.19	0.15		38.5°Lat.	III
1.4	0.0	0.87					0.14			141.7°Long.	
1.6	0.1	0.19	21.0	0.5	0.0	0.	0.17	0.14		39.9°Lat.	
1.0	0.1	0.					0.17			141.9°Long.	

MODIFIED MERCALLI INTENSITY V (Concluded)

FAR FIELD

M = 6.9

HARD SITE

	Hor Accel cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur sec $\geq .05g$	Vert Accel cm/sec^2	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel
Data Units	48	48	48	48	18		18	
Mean	54.70	2.72	0.89	1.20	21.32	0.39	1.54	0.57
S.D.	33.10	1.67	0.83	2.14	12.35	0.37	0.98	0.59
Mean + S.D.	87.80	4.39	1.73	3.34	33.67	0.38	2.52	0.57
Mean + 2 S.D.	120.90	6.06	2.56	5.48	46.02	0.38	3.50	0.58

MODIFIED MERCALLI INTENSITY V (Concluded)

FAR FIELD

M = 6.9

HARD SITE

Vert Accel g^2 sec	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel	Vert Displ cm	Ratio V/H Displ	Vert Dur sec ≥ .05g	Ratio V/H Dur	Hor Predom Period sec	Vert Predom Period sec	Ratio V/H Predom Period
18		18		18		18		48	18	
.32	0.39	1.54	0.57	0.92	1.03	0.0		0.38	0.62	1.63
.35	0.37	0.98	0.59	0.67	0.81	0.0		0.23	0.39	1.69
3.67	0.38	2.52	0.57	1.59	0.92	0.0		0.60	1.01	1.68
.02	0.38	3.50	0.58	2.27	0.89	0.0		0.83	1.39	1.67

MODIFIED MERCALLI INTENSITY V

FAR FIELD

M = 7.0 to 7.5

HARD SITE

Earthquake	Site Classification	Mag M_S	Focal Depth km	Distance to Source km	Hor Accel, cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥.05g	Vert Accel, cm/sec^2	Ver Ve cm/
Muroran-S	2H	7.4	20	218.4	151.1	6.6	0.9	29.91	43.1	
1968-05-16					124.0	5.7	2.2	17.78		
Miyako-S	2H	7.4	20	226.6	161.5	4.7	0.5	18.81		
1968-05-16					139.0	3.7	0.6	14.67		
Miyako-S	2H	7.1	130	378.0	53.9	1.3	0.1	0.08	23.0	
1981-01-23					43.0	1.1	0.1	0.		

	Hor Accel, cm/sec	Hor Vel cm/sec	Hor Displ cm	Hor Dur sec ≥.05g	Vert Accel, cm/sec^2	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel
Data Units	6	6	6	6	2		2	
Mean	112.08	3.85	0.73	13.54	33.05	0.29	1.35	0.35
S.D.	50.97	2.22	0.78	11.66				
Mean + S.D.	163.05	6.12	1.51	25.20				
Mean + 2 S.D.	214.02	8.39	2.30	36.86				

MODIFIED MERCALLI INTENSITY V

FAR FIELD

M = 7.0 to 7.5

HARD SITE

Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec > .05g	Vert Accel cm/sec^2	Vert Vel cm/sec	Vert Displ cm	Vert Dur Sec > .05g	Hor Predom Period sec	Vert Predom Period sec	Type of Fault	Epicenter Location	JMI
6.6	0.9	29.91	43.1	2.0	0.3	0.	0.27	0.29	Normal	41.4° Lat.	
5.7	2.2	17.78					0.29			143.3° Long.	
4.7	0.5	18.81					0.18		Normal	41.4° Lat.	
3.7	0.6	14.62					0.17			143.3° Long.	
1.3	0.1	0.08	23.0	0.7	0.1	0.	0.15	0.19		42.4° Lat.	
1.1	0.1	0.					0.16			142.2° Long.	

Vert Accel cm/sec^2	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel	Vert Displ cm	Ratio V/H Displ	Vert Dur sec > .05g	Ratio V/H Dur	Hor Predom Period sec	Vert Predom Period sec	Ratio V/H Predom Period
		2		2		2		6	2	
4.05	0.29	1.35	0.35	0.2	0.27	0.0		0.20	0.24	1.2
								0.06		
								0.26		
								0.32		

MODIFIED MERCALLI INTENSITY V

FAR FIELD

M = 6.9

SOFT SITE

Earthquake	Site Classification	Mag M_S	Focal Depth km	Distance to Source km	Hor Accel cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel cm/sec^2	Vert Vel cm/sec
C.I.T. Cat.:										
B022	3S	5.4	10	39.5	43.3	5.2	1.8	0.0	26.8	
					85.4	9.4	4.3	8.04		
B023	3S	5.4	10	39.5	32.1	2.0	0.8	0.0	10.7	
					26.4	2.2	0.4	0.0		
E071	3S	6.6	13	87.0	26.5	1.9	1.4	0.0	13.0	
					25.3	2.5	2.1	0.0		
F086	3S	6.6	13	51.1	104.6	17.4	14.8	5.52	42.7	
					80.5	15.1	10.7	7.72		
F101	3S	6.6	13	108.4	37.5	2.5	1.1	0.0	19.7	
					30.0	2.2	1.3	0.0		
F103	3S	6.6	13	47.2	91.5	4.4	2.5	7.72	47.4	
					120.5	5.4	2.4	7.48		
M180	3S	6.6	13	85.3	23.9	5.7	3.5	0.0	18.2	
					29.9	8.5	6.5	0.0		
N185	3S	6.6	13	76.7	67.3	3.3	1.7	3.02	41.5	
					67.3	4.5	2.1	5.34		
N195	3S	6.6	13	123.3	31.0	4.6	2.4	0.0	21.0	
					40.9	3.6	2.4	0.0		
N197	3S	6.6	13	185.4	25.6	2.2	1.2	0.0	14.0	
					35.4	2.6	1.0	0.0		
U313	3S	5.2			13.10	2.67	2.26	0.0	10.00	
					16.20	1.74	2.03	0.0		
V320	3S	3.8			2.02	0.28	0.32	0.0	1.52	
					2.42	0.33	0.43	0.0		
V322	3S	4.4	11	20.5	8.56	0.83	0.40	0.0	6.05	
					24.50	2.61	1.17	0.0		
V328	3S	4.0			2.07	0.42	0.38	0.0	2.79	
					9.00	0.91	0.48	0.0		
W342	3S	5.4	9	56.7	19.30	1.53	1.74	0.0	12.30	
					18.70	1.44	1.13	0.0		
Y371	3S	6.4	20	174.2	13.10	4.38	3.47	0.0	5.65	
					11.70	4.28	2.85	0.0		
Shiogama-S 1967-01-07	4S	6.3	40	100.4	56.2	3.5	0.5	0.55		
					45.1	2.6	0.4	0.		
Ofunato-S 1968-05-18	4S	5.1	20	171.3	85.8	13.2	1.9	9.30		
					63.1	5.8	0.9	5.54		
Hiroshima-S 1968-08-06	4S	6.6	20	117.0	73.5	4.3	0.4	2.26	32.9	
					66.9	5.5	0.9	3.61		
Kochi-S 1968-08-06	4S	6.6	20	110.9	47.3	5.4	0.7	0.		
					61.4	5.7	0.6	1.18		
Yamashita-Hen-S 1968-10-08	4S	5.3	70	199.5	21.9	3.7	0.2	0.22		
					31.4	1.5	0.1	0.		
Yokkaichi-Ji-S 1969-09-09	4S	6.6	0	100.3	47.6	2.9	0.5	0.		
					50.4	2.7	0.3	0.01		
Kinuura-S 1969-09-09	4S	6.6	0	101.3	59.2	4.1	0.5	3.97		
					90.7	5.9	0.6	5.30		
Kushiro-S 1970-01-21	3S	6.7	60	116.3	61.4	3.3	0.5	0.03		
					49.2	2.4	0.4	0.		
Hososhima-S 1970-07-26	4S	6.1	10	82.0	71.5	3.4	0.2	3.62		
					74.6	3.0	0.4	0.98		

(Continued)

MODIFIED MERCALLI INTENSITY V

FAR FIELD

M = 6.9

SOFT SITE

Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel, cm/sec²	Vert Vel cm/sec	Vert Displ cm	Vert Dur Sec ≥ .05g	Hor Predom Period sec	Vert Predom Period sec	Type of Fault	Epicenter Location	JMI
5.2	1.8	0.0	26.8	1.9	0.9	0.0	0.75	0.44	Strike-	33°47' N	
9.4	4.3	8.04					0.69		slip	118°08' W	
2.0	0.8	0.0	10.7	0.9	0.5	0.0	0.39	0.53	Strike-	33°47' N	
2.2	0.4	0.0					0.52		slip	118°08' W	
1.9	1.4	0.0	13.0	2.4	3.3	0.0	0.45	1.16	Thrust	34°24' N	
2.5	2.1	0.0					0.62			118°23.7' W	
17.4	14.8	5.52	42.7	6.7	4.0	0.0	1.05	0.99	Thrust	34°24' N	
15.1	10.7	7.72					1.18			118°23.7' W	
2.5	1.1	0.0	19.7	1.5	1.4	0.0	0.42	0.48	Thrust	34°24' N	
2.2	1.3	0.0					0.46			118°23.7' W	
4.4	2.5	7.72	42.4	2.3	1.7	0.0	0.30	0.40	Thrust	34°24' N	
5.4	2.4	7.48					0.28			118°23.7'W	
5.7	3.5	0.0	28.2	3.9	2.5	0.0	1.49	1.47	Thrust	34°24' N	
8.5	6.5	0.0					1.58			118°23'42"W	
3.3	1.7	3.02	41.5	2.5	1.6	0.0	0.31	0.38	Thrust	34°24'42" N	
4.5	2.1	5.34					0.42			118°24'00" W	
4.6	2.4	0.0	21.0	3.4	1.6	0.0	0.93	1.02	Thrust	34°24'42" N	
3.6	2.4	0.0					0.55			118°24'00" W	
2.2	1.2	0.0	14.0	1.4	1.1	0.0	0.54	0.61	Thrust	34°24'42" N	
2.6	1.0	0.0					0.46			118°24'00" W	
2.67	2.26	0.0	30.00	1.14	1.33	0.0	1.28	1.72		37°00'36" N	
1.74	2.03	0.0					0.62			121°47'18" W	
0.28	0.32	0.0	1.52	0.33	0.46	0.0	0.87	.30	Strike-	37°40' N	
0.33	0.43	0.0					0.56		slip	122°28' W	
0.83	0.40	0.0	6.05	0.88	0.88	0.0	0.61	0.41		37°39'00" N	
2.61	1.17	0.0					0.67			122°27'00" W	
0.42	0.38	0.0	2.79	0.54	0.51	0.0	1.27	1.22	Strike-	37°39'N	
0.91	0.48	0.0					0.63		slip	122°29' W	
1.53	1.74	0.0	12.30	0.68	0.52	0.0	0.50	0.35		34°16'12" N	
1.44	1.13	0.0					0.48			117°32'24" W	
4.38	3.47	0.0	5.65	2.21	1.94	0.0	2.10	2.46	Strike-	33°11'24" N	
4.28	2.85	0.0					2.29		slip	116°07'42" W	
3.5	0.5	0.55					0.39			38.3°Lat.	
2.6	0.4	0.					0.32			142.2°Long.	
13.2	1.9	9.30					0.97		R. Dip-	39.6°Lat.	
5.8	0.9	5.54					0.58		slip	143.6°Long.	
4.3	0.4	2.26	32.5	1.8	0.2	0.	0.37	.37	N.Strike-	33.3°Lat.	
5.5	0.9	3.61					0.52		slip	132.4°Long.	
5.4	0.7	0.					0.72		N.Strike-	33.3°Lat.	
5.7	0.6	1.18					0.58		slip	132.4°Long.	
3.7	0.2	0.22					0.32		Reverse	35.4°Lat.	
1.5	0.1	0.					0.30			140.1°Long.	
2.9	0.5	0.					0.38		R.Strike-	35.8°Lat	
2.7	0.3	0.01					0.34		slip	137.0°Long.	
4.1	0.5	3.97					0.43		R.Strike-	35.8°Lat.	
5.9	0.6	5.30					0.41		slip	137.0°Long.	
3.3	0.5	0.03					0.34		Reverse	42.3°Lat.	
2.4	0.4	0.					0.31			143.3°Long.	
3.4	0.2	3.62					0.30		R. Dip-	32.1°Lat.	
3.0	0.4	0.98					0.25		slip	132.1°Long.	

(Continued)

MODIFIED MERCALLI INTENSITY V (Concluded)

FAR FIELD

M = 6.9

SOFT SITE

Earthquake	Site Classification	Mag M_S	Focal Depth km	Distance to Source km	Hor Accel, cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec .05g	Vert Accel cm/sec^2	Vert Vel cm/sec
Yamashita-Hen-S	S	6.8	50	16.9	75.5	7.4	0.2	0.03		
1970-09-30					53.5	1.7	0.1	0.61		
Yamashita-Hen-S	S	5.3	20	62.9	51.2	2.4	0.1	0.05		
1971-07-23					54.0	2.5	0.1	0.33		
Sakata-S	S	5.5	20	41.3	37.7	1.2	0.2	0.		
1972-08-20					56.9	2.9	0.4	0.03		
Kinuura-S	S	5.3	20	13.8	61.7	1.5	0.1	0.0		
1974-02-10					51.4	3.5	0.4	0.37		
Hososhima-S	S	5.	20	101.4	46.	2.3	0.4	0.		
1974-06-17					63.2	4.0	0.3	0.		
Shinagawa-S	S	5.	30	54.8	50.	2.0	0.2	0.		
1974-08-04					53.	3.8	0.	0.		
Shimizu-Miho-S	S	5.	5	8.	4.	0.4	0.4	0.	7.	
1978-01-15					52.	3.	0.4	0.		
Hachinohe-S	S	5.	5	55.	56.	4.	0.2	0.	41.	
1978-05-16					59.	2.	0.3	0.		
Onahama-2-S	S	5.	5	40.	40.	2.	0.2	0.		
1978-10-					44.	3.	0.	0.		
Hiroshima-S	S	5.	50	228.	30.	1.5	0.8	0.	24.	
1978-07-13					30.	2.	0.4	0.		
Hososhima-S	S	5.	20	94.	47.	2.	0.2	0.	17.	
1978-07-26					87.	6.	0.4	0.		
Kashima-Tokan-S	S	5.	0	52.	34.	2.6	0.4	0.	7.	
1981-09-21					31.	2.	0.	0.		
Kashima-Tokan-S	S	5.	0	52.	44.	2.	0.	0.	7.	
1981-12-17					43.	2.	0.	1.		
Onahama-2-S	S	5.	0	60.	41.	2.	0.1	0.	5.	
1982-03-07					47.	2.	0.	0.		
Onahama-2-S	S	5.		238.	122.	3.6	1.	0.	58.	
1982-07-23					116.	8.	2.6	11.		
Kashima-Tokan-S	S	5.	0	241.	106.	5.	1.	5.	44.	
1982-07-23					87.	4.	1.	8.		
Hakodate-M	S	5.	30	146.	39.	9.	3.	0.	22.	
1983-06-21					51.	12.	5.	0.		

	Hor Accel, cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur sec .05g	Vert Accel, cm/sec^2	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel
Data Units	84	84	84	84	28		28	
Mean	53.99	3.94	1.37	1.61	22.26	0.41	1.72	0.44
S.D.	28.76	3.11	2.19	2.75	15.15	0.53	1.39	0.45
Mean + S.D.	82.75	7.05	3.57	4.36	37.42	0.45	3.10	0.44
Mean + 2 S.D.	111.52	10.16	5.76	7.12	52.57	0.47	4.49	0.44

MODIFIED MERCALLI INTENSITY V (Concluded)

FAR FIELD

M = 6.9

SOFT SITE

Hor Displ cm	Hor Dur Sec >.05g	Vert Accel cm/sec²	Vert Vel cm/sec	Vert Displ cm	Vert Dur Sec >.05g	Hor Predom Period sec	Vert Predom Period sec	Type of Fault	Epicenter Location	JMI
0.1	0.03					0.19		Reverse	35.6°Lat.	
0.1	0.61					0.20			139.7°Long.	
0.1	0.02					0.29		R.Strike-	35.6°Lat.	
0.1	0.13					0.29		slip	139.0°Long.	
0.2	0.					0.29			38.7°Lat.	
0.4	0.03					0.32			140.2°Long.	
0.1	0.02					0.15			35.1°Lat.	
0.4	0.31					0.31			136.9°Long.	
0.4	0.					0.31			32.4°Lat.	
0.1	1.39					0.20			132.4°Long.	
0.1	0.					0.25			36.1°Lat.	
0.2	2.18					0.24			139.9°Long.	
0.6	0.	5.5	1.1	0.3	0.	0.48	[illegible]		34.8°Lat.N	
0.9	0.23					0.63			138.9°Long.E	
0.3	0.12	41.1	1.2	0.1	0.	0.33	[illegible]		40.95°Lat.N	
0.3	0.44					0.22			141.4°Long.E	
0.1	0.84	[illegible]	0.5	0.0	0.	0.15	[illegible]		36.68°Lat.N	
0.2	0.53					0.26			141.0°Long.E	
0.8	5.32	39.7	1.3	0.1	0.	0.25	[illegible]		38.8°Lat.N	
1.6	3.84					0.30			138.0°Long.E	
1.0	1.47	[illegible]	1.2	[illegible]	0.	0.28	[illegible]		32.6°Lat.N	
0.8	1.61					0.50			131.35°Long.E	
0.3	0.13	[illegible]	0.6	[illegible]	0.	0.41	[illegible]		35.8°Lat.N	
0.2	0.					0.42			141.1°Long.E	
0.2	0.	33.3	0.3	0.	0.	0.38	[illegible]		36.44°Lat.N	
0.2	1.76					0.28			140.45°Long.E	
0.1	0.02	20.2	0.5	0.0	0.	0.17	0.14		36.44°Lat.N	
0.0	0.					0.16			140.45°Long.E	
1.1	7.63	56.1	1.6	0.2	0.31	0.29	.38	Reverse	36.194°Lat.N	
2.6	11.30					0.44			141.702°Long.E	
1.5	5.39	44.3	1.5	0.4	0.	0.30	[illegible]		36.194°Lat.N	
1.2	8.37					0.35			141.702°Long.E	
3.7	0.	22.6	3.8	1.7	0.	1.54	1.04		41.34°Lat.N	III
5.6	0.01					1.50			139.1°Long.E	

Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel	Vert Displ cm	Ratio V/H Displ	Vert Dur sec >.05g	Ratio V/H Dur.	Hor Predom Period sec	Vert Predom Period sec	Ratio V/H Predom Period
	28		28		28		84	28	
0.41	1.72	0.44	0.97	0.71	0.0	0.0	0.55	0.66	1.2
0.53	1.39	0.45	1.01	0.46	0.0	0.0	0.43	0.53	1.23
0.45	3.10	0.44	1.99	0.56	0.0	0.0	0.98	1.19	1.21
0.47	4.49	0.44	3.00	0.52	0.0	0.0	1.41	1.72	1.22

MODIFIED MERCALLI INTENSITY V

FAR FIELD

M = > 7.5

SOFT SITE

Earthquake	Site Classification	Mag M_S	Focal Depth km	Distance to Source km	Hor Accel cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec >.05g	Vert Accel cm/sec^2	[illegible]
Hakodate-M	4S	7.[illegible]	24	214.3	55.9	13.4	5.5	[illegible]	44.[illegible]	[illegible]
1983-05-26					58.6	14.7	7.1	[illegible]		

	Hor Accel cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur sec >.05g	Vert Accel cm/sec^2	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel
Data Units	[illegible]	[illegible]	[illegible]	[illegible]	1		[illegible]	
Mean	[illegible]	[illegible]	[illegible]	19.04				
S.D.								
Mean + S.D.								
Mean + 2 S.D.								

MODIFIED MERCALLI INTENSITY V

FAR FIELD

M = > 7.5

SOFT SITE

Hor Vel sec	Hor Displ cm	Hor Dur Sec > .05g	Vert Accel cm/sec²	Vert Vel cm/sec	Vert Displ cm	Vert Dur Sec > .05g	Hor Predom Period sec	Vert Predom Period sec	Type of Fault	Epicenter Location	MMI
5.4	5.5	17.31	44.2	6.4	2.5	[illegible]	1.50	[illegible]		40.46° Lat.	III
[illegible]	7.1	20.77					1.58			139.1° Long.	

[illegible]	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel	Vert Displ cm	Ratio V/H Displ	Vert Dur Sec > .05g	[illegible]	Hor Predom Period sec	Vert Predom Period sec	Ratio V/H Predom Period
		[illegible]		[illegible]		[illegible]		[illegible]	[illegible]	
								1.54		

MODIFIED MERCALLI INTENSITY V

FAR FIELD

M = 7.0 to 7.5

SOFT SITE

Earthquake	Site Classification	Mag M_S	Focal Depth km	Distance to Source km	Hor Accel$_2$ cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel$_2$ cm/sec^2	Vert Vel cm/sec
Tagonoura-S	4S	7.0	40	288.6	24.1	1.6	0.3	0.0		
1972-02-29					36.6	3.6	0.7	0.0		
Tomakomai-S	3S	7.4	40	360.9	32.9	5.7	3.1	0.0		
1973-06-17					21.4	3.2	1.3	0.0		

	Hor Accel$_2$ cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur sec ≥ .05g	Vert Accel$_2$ cm/sec^2	Ratio V/H Accel	Vert Vel cm sec	Ratio V/H Vel
Data Units	4	4	4	4				
Mean	28.75	3.52	1.35	0.0				
S.D.								
Mean + S.D.								
Mean + 2 S.D.								

MODIFIED MERCALLI INTENSITY V

FAR FIELD

M = 7.0 to 7.5

SOFT SITE

Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel cm/sec^2	Vert Vel cm/sec	Vert Displ cm	Vert Dur Sec ≥ .05g	Hor Predom Period sec	Vert Predom Period sec	Type of Fault	Epicenter Location	JMI
1.6	0.3	0.0					0.43		R. Dip-	33.3° Lat.	
3.6	0.7	0.0					0.61		slip	141.3° Long.	
5.7	3.1	0.0					1.09		Thrust	42.9° Lat.	
3.2	1.3	0.0					0.93		Benioff Zone	146.0° Long.	

cm/sec^2	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel	Vert Displ cm	Ratio V/H Displ	Vert Dur sec ≥ .05g	Ratio V/H Dur	Hor Predom Period sec	Vert Predom Period sec	Ratio V/H Predom Period
								0.76		

MODIFIED MERCALLI INTENSITY VI

FAR FIELD

M = 6.9

HARD SITE

Earthquake	Site Classification	Mag M_S	Focal Depth km	Distance to Source km	Hor Accel$_2$ cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel$_2$ cm/sec^2	Vert Vel cm/s
C.I.T. Cat.:										
A017	2H	5.3	11	26.7	39.0	2.0	1.5	0.0	15.3	0.
					23.7	1.2	1.1	0.0		
B026	2H	5.5	16	57.6	140.9	6.6	3.9	1.32	31.6	1.
					87.1	6.6	1.6	1.24		
B027	2H	6.6	16	99.7	61.3	3.5	2.0	(0.06)	19.2	2.
					38.4	3.4	2.2	0.0		
B030	2H	5.5	16	46.1	53.1	6.9	2.0	(0.04)	29.2	3.
					74.1	4.7	1.9	(0.42)		
M179	2H	6.6	13	71.9	20.8	1.1	0.7	0.0	38.5	2.
					46.7	2.6	0.9	0.0		
N191	2H	6.6	13	69.0	24.7	4.1	2.6	0.0	18.9	2.
					40.1	5.0	3.4	0.0		
P220	2H	6.6	13	96.7	24.10	7.01	6.92	0.0	9.29	3.
					34.30	5.78	6.70	0.0		
P221	1H	6.6	13	45.2	137.00	5.29	3.15	10.88	47.60	4.
					165.00	6.66	5.91	5.80		
U308	2H	5.7			57.50	3.11	1.21	4.24	14.40	1.
					73.50	3.60	1.18	0.26		
U312	2H	5.8	10-20		103.00	11.80	1.76	0.16	32.40	2.
					232.00	11.90	1.66	0.70		
V319	2H	6.0			52.90	3.35	0.80	(0.02)	26.30	2.
					35.40	2.89	1.26	0.0		
V330	2H	5.0			45.30	3.52	1.70	0.0	12.90	1.
					47.30	2.67	1.18	0.0		
W335	1H	5.4	9	22.7	69.80	5.55	2.42	(0.72)	59.30	2.
					54.90	1.96	2.00	(0.44)		
W336	2H	5.4	9	25.4	55.90	2.94	0.78	(0.14)	36.90	1.
					69.40	3.96	1.21	(0.06)		
Miyako-S	2H	5.8	80	32.0	195.9	5.0	0.3	14.62	104.7	1.
1970-04-01					182.1	3.9	0.3	13.53		
Miyako-S	2H	6.2	40	81.2	81.2	5.1	5.3	6.81		
1970-09-14					60.3	4.9	6.3	6.88		
Kashima-Ji-S	2H	5.9	40	25.6	45.1	4.7	0.9	0.	18.1	1.
1973-09-30					82.1	9.9	1.5	5.63		
Kashima-Ji-S	2H	5.8	20	25.6	28.6	2.3	0.5	0.		
1973-10-01					52.1	4.1	1.2	0.01		
Kashima-S	2H	5.2	40	17.3	51.2	2.1	0.1	0.28	31.2	0.
1971-10-11					168.2	7.1	0.8	0.91		
Ofunato-Bochi	1H	6.4	20	46.1	68.1	1.5	0.1	2.17	30.3	2.
1973-11-19					134.8	5.0	0.5	1.71		
Kashima-Ji-S	2H	6.1	40	37.8	38.4	4.8	1.0	0.	17.5	1.
1974-03-03					111.5	10.1	1.4	0.42		
Kashima-Ji-S	2H	6.3	20	81.7	76.4	3.5	0.4	0.88	23.4	0.
1974-07-08					55.1	3.1	0.6	2.88		
Kashima-Ji-S	2H	6.1	40	47.3	74.2	6.9	1.0	0.59	24.1	2.
1974-11-16					91.2	5.7	0.6	2.75		
Ofunato-Bo-S	1H	5.9	51	97.4	64.6	3.9	0.3	0.02	39.4	1.
1982-06-01					187.9	16.5	4.6	2.34		

(Continued)

( ) = WES recalculated value

MODIFIED MERCALLI INTENSITY VI

FAR FIELD

M = 6.9

HARD SITE

Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel cm/sec^2	Vert Vel cm/sec	Vert Displ cm	Vert Dur Sec ≥ .05g	Hor Predom Period sec	Vert Predom Period sec	Type of Fault	Epicenter Location	JMI
2.0	1.5	0.0	15.3	0.9	1.3	0.0	0.32	0.37	Strike-	37°40' N	
1.2	1.1	0.0					0.32		slip	122°29' W	
6.6	3.9	1.32	31.6	1.4	0.6	0.0	0.29	0.28		40°18' N	
6.6	1.6	1.24					0.48			124°48' W	
3.5	2.0	(0.06)	19.2	2.1	1.9	0.0	0.36	0.69		40°54' N	
3.4	2.2	0.0					0.57			125°24' W	
6.9	2.0	(0.04)	29.2	3.0	1.5	0.0	0.82	0.64		40°12' N	
4.7	1.9	(0.42)					0.40			124°25' W	
1.1	0.7	0.0	38.5	2.0	1.2	0.0	0.33	0.33	Thrust	34°24' N	
2.6	0.9	0.0					0.35			118°23'42" W	
4.1	2.6	0.0	18.9	2.2	1.4	0.0	1.04	0.73	Thrust	34°24'42" N	
5.0	3.4	0.0					0.78			118°24'00" W	
7.01	6.92	0.0	9.29	3.47	2.32	0.0	1.83	2.35	Thrust	34°24'42" N	
6.78	6.70	0.0					1.06			118°24'00" W	
5.29	3.15	10.88	47.60	4.46	2.46	0.0	0.24	0.59	Thrust	34°24'42" N	
6.66	5.91	5.80					0.25			118°24'00" W	
3.11	1.21	4.24	14.40	1.06	0.81	0.0	0.34	0.46		40°49' N	
1.60	1.18	0.26					0.31			124°53' W	
1.80	1.76	0.16	32.40	2.69	1.00	0.0	0.72	0.52	Strike-	40°30' N	
1.90	1.66	0.70					0.32		slip	124°36' W	
3.35	0.80	(0.02)	26.30	2.63	1.20	0.0	0.39	0.63		35°50' N	
1.99	1.26	0.0					0.51			121°10' W	
3.52	1.70	0.0	12.90	1.50	2.00	0.0	0.49	0.73	Strike-	40°58' N	
2.67	1.18	0.0					0.35		slip	124°12' W	
3.55	2.42	(0.72)	59.30	2.56	1.15	0.0	0.50	0.27		34°16'12" N	
1.96	2.00	(0.44)					0.22			117°32'24" W	
2.94	0.78	(0.14)	36.90	1.25	0.36	0.0	0.33	0.21		34°16'12" N	
3.96	1.21	(0.06)					0.36			117°32'24" W	
5.0	0.3	14.62	104.7	1.9	0.1	8.90	0.16	0.11	R.Dip-	39.9° Lat.	
3.9	0.3	13.53					0.13		slip	142.1° Long.	
6.1	5.3	6.81					0.39		Reverse	38.9° Lat.	
7.9	6.3	6.88					0.51			142.0° Long.	
4.7	0.9	0.	18.1	1.4	0.1	0.	0.65	0.48		35.7° Lat.	
9.9	1.5	5.63					0.76			140.7° Long.	
2.3	0.5	0.					0.51			35.7° Lat.	
6.3	1.2	0.01					0.49			140.7° Long.	
7.1	0.1	0.28	31.2	0.8	0.1	0.	0.25	0.15	R.Dip-	35.9° Lat.	
7.2	0.8	0.91					0.27		slip	140.5° Long.	
2.5	0.1	2.17	30.3	2.2	0.2	0.	0.14	0.46	Thrust	38.8° Lat.	
7.0	0.5	1.71					0.23		Benioff Zone	142.2° Long.	
4.8	1.0	0.	17.5	1.4	0.2	0.	0.78	0.50	Thrust	35.6° Lat.	
6.1	1.4	0.42					0.57		Benioff Zone	140.8° Long.	
3.5	0.4	0.88	23.4	0.9	0.1	0.	0.29	0.25	Thrust	36.4° Lat.	
3.1	0.6	2.88					0.35		Benioff Zone	141.4° Long.	
4.9	1.0	0.59	24.1	2.0	0.2	0.	0.59	0.52		35.8° Lat.	
2.7	0.6	2.75					0.39			141.2° Long.	
3.9	0.3	0.02	39.4	1.7	0.1	0.	0.38	0.28		38.69° Lat.	
14.5	4.6	2.34					0.55			142.09° Long.	

(Continued)

MODIFIED MERCALLI INTENSITY VI (Concluded

FAR FIELD

M = 6.9

HARD SITE

Earthquake	Site Classification	Mag M_S	Focal Depth km	Distance to Source km	Hor Accel cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel cm/sec^2	Ver Vel cm
Ofunato-Bochi-S	1H	5.9	51	97.4	28.6	1.2	0.1	0.	11.2	
1982-06-01					58.9	2.7	0.2	0.01		
Miyako-S	2H	5.9	51	77.4	49.5	1.3	0.0	0.	10.6	
1982-06-01					59.9	1.6	0.0	0.01		
Hirara-S	2H	6.2	30	103.4	36.0	1.4	0.2	0.	14.9	
1976-06-20					52.2	3.2	0.4	0.01		

	Hor Accel cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur sec ≥ .05g	Vert Accel cm/sec^2	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel
Data Units	54	54	54	54	25		25	
Mean	74.84	4.65	1.71	1.65	28.69	0.38	1.83	0.39
S.D.	49.28	3.00	1.76	3.31	20.09	0.41	0.95	0.32
Mean + S.D.	124.12	7.65	3.47	4.96	48.78	0.39	2.78	0.36
Mean + 2 S.D.	173.41	10.66	5.23	8.27	68.88	0.40	3.73	0.35

MODIFIED MERCALLI INTENSITY VI (Concluded)

FAR FIELD

M = 6.9

HARD SITE

Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel cm/sec^2	Vert Vel cm/sec	Vert Displ cm	Vert Dur Sec ≥ .05g	Hor Predom Period sec	Vert Predom Period sec	Type of Fault	Epicenter Location	JMI
1.2	0.1	0.	11.2	0.5	0.0	0.	0.25	0.26		38.69° Lat.	
2.7	0.2	0.01					0.29			142.09° Long.	
1.3	0.0	0.	10.6	1.3	0.6	0.	0.17	0.78		38.69° Lat.	
1.6	0.0	0.01					0.17			142.09° Long.	
1.4	0.2	0.	14.9	0.5	0.0	0.	0.25	0.22		24.5° Lat.	
3.2	0.4	0.01					0.38			126.2° Long.	

Vert Accel cm/sec^2	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel	Vert Displ cm	Ratio V/H Displ	Vert Dur sec ≥ .05g	Ratio V/H Dur	Hor Predom Period sec	Vert Predom Period sec	Ratio V/H Predom Period
		25		25		25		54	25	
[illegible].89	0.38	1.83	0.39	0.84	0.49	0.36	0.22	0.45	0.51	1.13
[illegible].09	0.41	0.95	0.32	0.77	0.44	1.78	0.54	0.28	0.43	1.53
[illegible].78	0.39	2.78	0.36	1.61	0.46	2.14	0.43	0.73	0.94	1.29
[illegible].88	0.40	3.73	0.35	2.38	0.45	3.92	0.47	1.02	1.37	1.34

MODIFIED MERCALLI INTENSITY VI

FAR FIELD

M = 7.0 to 7.5

HARD SITE

Earthquake	Site Classification	Mag M_S	Focal Depth km	Distance to Source km	Hor Accel, cm/sec²	Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel, cm/sec²	Vert Vel cm/s
Miyako-S	2H	7.3	20	116.9	207.3	5.9	0.7	36.24	67.8	2.
1968-06-12					164.7	5.8	0.7	33.64		
Muroran-S	2H	7.1	130	165.8	155.9	13.4	2.5	6.79	71.2	3.
1981-01-23					236.2	8.7	1.2	7.81		

	Hor Accel, cm/sec²	Hor Vel cm/sec	Hor Displ cm	Hor Dur sec ≥ .05g	Vert Accel, cm/sec²	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel
Data Units	4	4	4	4	2		2	
Mean	191.02	8.45	1.27	21.12	69.5	0.36	2.75	0.32

MODIFIED MERCALLI INTENSITY VI

FAR FIELD

M = 7.0 to 7.5

HARD SITE

Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel cm/sec^2	Vert Vel cm/sec	Vert Displ cm	Vert Dur Sec ≥ .05g	Hor Predom Period sec	Vert Predom Period sec	Type of Fault	Epicenter Location	JMI
5.9	0.7	36.24	67.8	2.5	0.6	17.75	0.18	0.22	R. Dip-slip	39.4° Lat.	IV
5.8	0.7	33.64					0.22			143.3° Long.	
13.4	2.5	6.79	71.2	3.0	0.5	2.52	0.54	0.27		42.4° Lat.	
8.7	1.2	7.81					0.23			142.2° Long.	

t cm/sec^2	Ratio V/H Accel	Vert Vel cm/sec^2	Ratio V/H Vel	Vert Displ cm^2	Ratio V/H Displ	Vert Dur sec ≥ .05g^2	Ratio V/H Dur	Hor Predom Period sec^4	Vert Predom Period sec^2	Ratio V/H Predom Period
	0.36	2.75	0.32	0.55	0.43	10.13	0.48	0.29	0.24	0.83

MODIFIED MERCALLI INTENSITY VI

FAR FIELD

M = 6.9

SOFT SITE

Earthquake	Site Classification	Mag M_S	Focal Depth km	Distance to Source km	Hor Accel. cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥.05g	Vert Accel. cm/sec^2	Ver... cm
Shimizu-Kojyo	4S	6.1	20	20.8	111.9	8.8	1.5	13.75	47.8	
1965-04-20					163.0	9.4	1.5	14.87		
Onahama-S	4S	5.8	40	76.4	94.7	5.1	0.5	1.50		
1966-04-03					142.8	7.6	4.5	1.15		
Ofunato-S	4S	6.3	40	94.8	42.6	1.9	0.2	0.		
1967-01-07					53.8	4.7	0.6	0.02		
Yamashita-Hen-S	4S	6.1	70	65.8	53.7	6.0	0.7	0.19		
1968-07-01					47.0	3.8	0.8	0.		
Shinagawa-S	4S	6.1	70	53.3	88.3	7.8	1.2	7.34	26.8	
1968-07-01					129.8	7.5	1.2	9.61		
Ofunato-S	4S	6.4	40	84.9	45.5	2.8	0.4	0.		
1968-07-05					69.7	5.1	0.9	0.52		
Hososhima-S	4S	6.6	20	139.7	53.3	5.0	0.7	0.39		
1968-08-06					51.5	5.5	1.9	0.13		
Hososhima-S	4S	6.5	20	90.5	103.1	2.9	0.2	4.82	52.0	
1969-04-21					137.5	6.1	0.6	6.59		
Hososhima-S	4S	6.7	30	73.7	167.3	8.8	1.3	15.85	58.2	
1970-07-26					147.8	13.4	1.7	11.30		
Yokka-Chitose	4S	6.1	40	79.8	90.9	6.1	0.8	6.06	50.1	
1971-01-05					120.8	7.1	0.8	1.15		
Nagova-Zokan-S	4S	6.1	40	81.7	52.8	3.3	1.4	0.01	24.9	
1971-01-05					61.7	5.2	0.4	1.67		
Nagova-Inae-S	4S	6.1	40	81.7	53.2	3.0	0.5	0.03	39.8	
1971-01-05					49.4	4.5	0.6	0.		
Hachinohe-S	3S	6.4	40	56.8	65.3	3.6	0.7	2.92	36.6	
1972-03-20					76.9	2.8	0.4	4.95		
Aomori-S	4S	6.4	40	84.7	70.3	3.0	0.6	6.28	30.9	
1972-03-20					86.7	3.0	0.4	3.16		
Kushiro-S	3S	5.8	40	73.6	153.9	6.3	2.0	3.11	27.3	
1972-05-11					83.8	5.5	0.7	0.86		
C.I.T. Cat.:										
A011	3S	6.8			32.4	4.0	2.4	0.0	12.4	
					50.1	7.0	4.1	0.0		
A019	3S	6.5	20	72.6	127.8	25.8	12.2	2.56	29.7	
					56.3	14.7	11.0	0.0		
A020	3S	6.5	20	111.7	29.5	6.0	4.4	0.0	12.7	
					28.9	6.1	3.0	0.0		
B021	3S	6.3	10	48.8	130.6	28.7	15.5	1.72	149.5	
					151.5	17.0	17.5	5.82		
B024	3S	6.5	16	62.9	156.8	20.5	4.2	12.86	68.1	
					179.1	11.5	3.7	18.12		
F087	3S	6.6	13	89.4	25.8	5.0	3.6	0.0	16.7	
					28.2	8.0	5.7	0.0		
H118	3S	6.6	13	51.8	33.7	11.8	8.8	0.0	41.0	
					32.7	9.1	7.8	0.0		
H124	3S	6.6	13	77.9	34.9	4.4	2.1	0.0	14.7	
					34.5	5.8	2.7	0.0		

(Continued)

( ) = WES recalculated value

MODIFIED MERCALLI INTENSITY VI

FAR FIELD

M = 6.9

SOFT SITE

Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥.05g	Vert Accel cm/sec^2	Vert Vel cm/sec	Vert Displ cm	Vert Dur Sec ≥.05g	Hor Predom Period sec	Vert Predom Period sec	Type of Fault	Epicenter Location	JMI
8.8	1.5	13.75	47.8	4.8	0.7	0.	0.50	0.63	Strike-	34.9° Lat.	
9.4	1.5	14.87					0.36		slip	138.3° Long.	
3.1	0.5	1.50					0.34			36.7° Lat.	
7.6	4.5	1.15					0.33			141.7° Long.	
1.9	0.2	0.					0.28			38.3° Lat.	
4.7	0.6	0.02					0.55			142.2° Long.	
6.0	0.7	0.19					0.71		R. Dip-	36.0° Lat.	
2.8	0.8	0.					0.51		slip	139.4° Long.	
7.8	1.2	7.34	26.8	1.3	0.1	0.	0.56	0.58	R. Dip-	36.0° Lat.	
7.5	1.2	9.61					0.36		slip	139.4° Long.	
1.8	0.4	0.					0.38		R. Dip-	38.4° Lat.	
4.1	0.9	0.52					0.46		slip	142.2° Long.	
4.0	0.7	0.39					0.59		N.Strike-	33.3° Lat.	
7.5	1.9	0.13					0.66		slip	132.4° Long.	
1.8	0.2	4.82	52.0	1.7	0.2	0.	0.18	0.2	Reverse	32.1° Lat.	
6.1	0.6	6.59					0.28		Fault	132.2° Long.	
8.8	1.3	15.85	58.2	2.2	0.2	4.39	0.43	0.7	R. Dip-	32.1° Lat.	
0.4	1.7	11.00					0.53		slip	132.0° Long.	
6.1	0.8	6.06	50.1	2.2	0.2	0.01	0.42	0.7	N.Strike-	34.4° Lat.	
7.1	0.8	1.15					0.37		slip	137.2° Long.	
3.3	1.4	0.01	24.9	1.7	0.2	0.	0.39	0.43	N.Strike-	34.4° Lat.	
5.2	0.4	1.67					0.52		slip	137.2° Long.	
2.0	0.5	0.03	39.8	2.0	0.1	0.	0.35	0.31		34.4° Lat.	
4.5	0.6	0.					0.57			137.2° Long.	
3.6	0.7	2.92	36.6	1.4	0.2	0.	0.35	0.37	N.Strike-	41.0° Lat.	
2.8	0.4	4.95					0.23		slip	141.8° Long.	
3.0	0.6	6.28	30.9	1.4	0.2	0.	0.27	0.28	N.Strike-	41.0° Lat.	
3.0	0.4	3.16					0.22		slip	141.8° Long.	
6.3	2.0	3.11	27.3	2.3	0.3	0.	0.26	0.63	Reverse	42.5° Lat.	
5.5	0.7	0.86					0.41			145.0° Long.	
4.0	2.4	0.0	12.4	2.9	1.6	0.0	0.78	1.47		31°45' N	
7.0	4.1	0.0					0.88			115°55' W	
20.8	12.2	2.56	29.7	3.4	3.9	0.0	1.27	0.72	Strike-	33°09' N	
14.7	11.0	0.0					1.64		slip	116°08' W	
6.0	4.4	0.0	12.7	1.9	1.3	0.0	1.28	0.94	Strike-	33°09' N	
6.1	3.0	0.0					1.33		slip	116°08' W	
18.7	15.5	1.72	149.5	12.0	7.4	3.64	1.38	0.50	Strike-	33°35' N	
17.0	17.5	5.82					0.70		slip	117°59' W	
20.5	4.2	12.86	68.1	8.8	5.6	11.70	0.82	0.81	Strike-	32°12' N	
11.5	3.7	18.12					0.40		slip	115°30' W	
5.0	3.6	0.0	16.7	2.4	1.7	0.0	1.17	0.90	Thrust	34°24' N	
8.0	5.7	0.0					1.78			118°23.7' W	
11.8	8.8	0.0	41.0	6.9	3.9	0.0	2.20	.06	Thrust	34°24'42" N	
9.1	7.8	0.0					1.75			118°24'00" W	
4.4	2.1	0.0	14.7	2.3	1.9	0.0	0.79	.98	Thrust	34°24'42" N	
5.8	2.7	0.0					1.06			118°24'00" W	

(Continued)

MODIFIED MERCALLI INTENSITY VI (Continued)

FAR FIELD

M = 6.9

SOFT SITE

Earthquake	Site Classification	Mag M_S	Focal Depth km	Distance to Source km	Hor Accel, cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥.05g	Vert Accel, cm/sec^2	Vert Vel cm/sec	Vert
I131	3S	6.6	13	40.3	184.3	17.2	9.2	7.74	37.2	4.5	
					160.6	14.1	6.1	6.26			
N186	3S	6.6	13	55.6	95.7	8.8	4.9	2.76	58.6	3.6	
					96.7	9.7	5.0	4.62			
N187	3S	6.6	13	73.3	55.7	3.1	0.7	5.12	28.3	1.5	
					75.9	3.7	0.8	0.0			
N196	3S	6.6	13	76.5	35.0	9.5	8.0	0.0	25.8	4.9	
					31.2	9.3	6.7	0.0			
O204	3S	6.6	13	74.9	25.9	8.17	5.81	0.0	12.3	6.13	
					20.7	9.58	7.27	6.0			
O205	3S	6.6	13	74.7	28.4	7.37	6.39	0.0	16.1	4.24	
					28.1	10.30	8.72	0.0			
O206	3S	6.6	13	109.0	37.4	3.45	1.30	0.0	18.5	1.92	
					43.9	2.86	1.05	0.0			
P222	3S	6.6	13	80.3	25.90	7.25	4.54	0.0	10.40	3.39	
					25.20	5.51	4.92	0.0			
P231	3S	6.6	13	53.3	41.30	10.60	8.28	0.0	17.90	5.88	
					37.70	13.30	10.20	0.0			
S267	3S	6.6	13	53.6	55.50	13.50	8.49	0.04	25.40	7.44	
					61.50	13.80	9.38	0.02			
T286	3S	6.5	16	49.2	58.40	6.22	4.24	(2.16)	25.10	1.58	
					46.50	6.05	3.33	0.0			
T293	3S	6.3	16	149.0	13.50	2.43	2.02	0.0	4.96	1.36	
					14.70	2.40	1.66	0.0			
U305	3S	5.3	16	39.6	52.00	4.19	2.24	(0.02)	23.10	1.94	
					48.90	4.52	1.36	0.0			
U307	3S	5.0			55.50	5.25	1.85	(0.04)	23.60	2.10	
					35.30	3.64	1.21	0.0			
V317	3S	5.4			14.90	1.33	0.85	0.0	6.69	0.79	
					11.20	1.42	0.49	0.0			
V332	3S	6.3	12	152.0	14.40	1.57	0.74	0.0	8.07	0.83	
					12.40	1.74	0.75	0.0			
W338	3S	5.4	9	24.6	113.00	4.75	1.75	*	52.50	1.85	
					57.50	3.10	1.66	*			
W339	3S	5.4	9	32.8	40.20	2.55	0.95	0.0	33.60	1.30	
					35.30	1.87	0.70	0.0			
Y370	3S	6.4	20	147.6	21.40	3.53	4.25	0.0	21.40	1.80	
					28.10	2.71	2.11	0.0			
Y372	3S	6.4	20	206.1	8.73	3.19	4.98	0.0	5.14	1.75	
					9.51	2.86	2.11	0.0			
Y373	3S	6.4	20	221.2	7.35	1.35	0.53	0.0	4.89	0.99	
					7.02	1.32	0.96	0.0			
Y375	3S	6.4	20	213.8	9.82	2.20	1.70	0.0	6.38	1.14	
					10.30	2.24	1.84	0.0			
Y376	3S	6.4	20	212.9	6.99	2.10	2.02	0.0	3.81	0.99	
					10.00	2.45	1.62	0.0			
Y378	3S	6.4	20	219.7	6.97	2.23	1.07	0.0	5.41	1.23	
					11.40	3.07	2.30	0.0			
Y379	3S	6.4	20	213.1	18.40	4.27	2.50	0.0	6.97	2.38	
					18.50	4.65	2.69	0.0			

(Continued)

( ) = WES recalculated value

* = No data

MODIFIED MERCALLI INTENSITY VI (Continued)

FAR FIELD

M = 6.9

SOFT SITE

... sec	Hor Displ cm	Hor Dur Sec ≥.05g	Vert Accel cm/sec²	Vert Vel cm/sec	Vert Displ cm	Vert Dur Sec ≥.05g	Hor Predom Period sec	Vert Predom Period sec	Type of Fault	Epicenter Location	JMI
[illegible]	9.2	[illegible]	37.2	4.5	2.3	0.0	0.58	0.76	Thrust	34°24'42" N	
[illegible]	6.1	[illegible]					0.55			118°24'00" W	
[illegible]	4.9	2.[illegible]6	58.6	3.6	2.3	0.0	0.58	0.38	Thrust	34°24'42" N	
[illegible]	5.0	4.62					0.63			118°24'00" W	
[illegible]	0.[illegible]	5.12	28.3	1.5	0.8	0.0	0.35	0.33	Thrust	34°24'42" N	
[illegible]	0.8	0.0					0.31			118°24'00" W	
[illegible]	8.0	0.0	25.8	4.9	3.8	0.0	1.20	1.19	Thrust	34°24'42" N	
[illegible]	6.7	0.0					1.87			118°24'00" W	
[illegible]	5.81	0.0	12.2	6.12	3.58	0.0	1.98	3.15	Thrust	34°24'42" N	
[illegible]58	7.2[illegible]	0.0					2.91			118°24'00" W	
[illegible]37	6.39	[illegible].0	16.1	4.24	2.83	0.0	1.63	1.65	Thrust	34°24'42" N	
[illegible].30	8.[illegible]2	0.0					2.30			118°24'00" W	
[illegible].45	1.30	0.0	18.5	1.52	0.80	0.0	0.58	0.52	Thrust	34°24'42" N	
[illegible].86	1.05	0.0					0.41			118°24'00" W	
[illegible].[illegible]5	4.54	0.0	10.40	3.19	2.17	0.0	1.[illegible]6	1.92	Thrust	34°24'42" N	
[illegible].51	4.92	0.0					1.37			118°24'00" W	
[illegible].60	8.28	0.0	17.90	5.68	3.47	0.0	1.6[illegible]	[illegible].99	Thrust	34°24'42" N	
[illegible].40	10.20	0.0					2.22			118°24'00" W	
[illegible].[illegible]0	8.49	0.[illegible]4	25.40	5.42	3.64	0.0	1.53	1.34	Thrust	34°24'42" N	
[illegible].20	9.38	0.0[illegible]					1.41			118°24'00" W	
[illegible]	4.[illegible]4	(0.16[illegible]	25.10	1.58	0.[illegible]9	0.0	0.67	0.39		32°58'00" N	
[illegible].[illegible]5	3.33	0.0					0.82			116°00'00" W	
[illegible].[illegible]3	2.02	0.0	4.96	1.36	1.[illegible]2	0.0	1.13	1.[illegible]2		31°48'00" N	
[illegible].[illegible]0	1.66	0.0					1.0[illegible]			114°30'00" W	
[illegible].29	2.[illegible]4	(0.02)	23.10	1.94	1.06	0.0	0.51	0.53		36°48' N	
[illegible].52	1.36	0.0					0.58			121°48' W	
[illegible].[illegible]5	1.85	(0.04)	23.60	2.10	1.08	0.0	0.59	0.56		36°47' N	
[illegible].64	1.21	0.0					0.65			121°26' W	
[illegible].33	0.85	0.0	6.69	0.79	0.41	0.0	0.56	0.74		33°47'00" N	
[illegible].42	0.49	0.0					0.79			118°15'00" W	
[illegible].[illegible]3	0.74	0.0	8.07	0.83	0.65	0.0	0.68	0.65	Strike-	39°24'00" N	
[illegible].[illegible]4	0.75	0.0					0.88		slip	120°06'00" W	
[illegible].[illegible]5	1.75	*	52.50	1.85	1.54		0.26	0.22		34°16'12" N	
3.10	1.66	*					0.34			117°32'24" W	
2.55	0.95	0.0	33.60	1.30	0.72	0.0	0.39	0.24		34°16'12" N	
[illegible].87	0.70	0.0					0.33			117°32'24" W	
3.53	4.25	0.0	21.40	1.80	1.07	0.0	1.04	0.53	Strike-	33°11'24" N	
[illegible].71	2.11	0.0					0.61		slip	116°07'42" W	
3.19	4.98	0.0	5.14	1.75	1.82	0.0	2.29	2.14	Strike-	33°11'24" N	
1.86	2.11	0.0					1.89		slip	116°07'42" W	
1.35	0.53	0.0	4.89	0.99	0.72	0.0	1.15	1.27	Strike-	33°11'24" N	
1.32	0.96	0.0					1.18		slip	116°07'42" W	
[illegible].20	1.70	0.0	6.38	1.14	0.85	0.0	1.41	1.12	Strike-	33°11'24" N	
[illegible].24	1.84	0.0					1.37		slip	116°07'42" W	
[illegible].10	2.02	0.0	3.81	0.99	1.05	0.0	1.88	1.63	Strike-	33°11'24" N	
2.45	1.62	0.0					1.54		slip	116°07'42" W	
[illegible].23	1.07	0.0	5.41	1.23	1.01	0.0	2.01	1.43	Strike-	33°11'24" N	
3.07	2.30	0.0					1.69		slip	116°07'42" W	
4.27	2.50	0.0	6.97	2.38	1.47	0.0	1.46	2.14	Strike-	33°11'24" N	
4.65	2.69	0.0					1.58		slip	116°07'42" W	

(Continued)

MODIFIED MERCALLI INTENSITY VI (Concluded)

FAR FIELD

M = 6.9

SOFT SITE

Earthquake	Site Classification	Mag M_S	Focal Depth km	Distance to Source km	Hor Accel$_2$ cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec > .05g	Vert Accel$_2$ cm/sec^2	Vert Vel cm/sec	Vert
Y380	3S	6.4	20	228.2	10.90	2.42	2.12	0.0	4.79	1.11	
					12.30	3.18	1.38	0.0			
Wakayama-Ji-S	4S	5.8	40	42.4	78.1	4.5	0.8	0.05	12.4	1.0	
1973-11-25					34.6	3.1	0.7	0.			
Hachinohe-S	3S	5.6	20	53.4	58.4	2.5	0.4	1.02	16.0	1.1	
1974-09-04					45.2	3.0	0.3	0.			
Yamashita-Hen-S	4S	6.2	15	81.3	76.9	5.2	0.9	2.12	23.9	1.0	
1980-06-29					91.6	5.9	0.9	5.05			
Shinagawa-S	4S	6.1	73	90.2	102.4	8.5	1.1	5.51	35.9	1.6	
1980-09-25					139.6	12.1	1.0	8.06			
Keihin-Ji-S	4S	6.1	73	89.0	92.0	4.5	0.5	0.87	24.9	1.5	
1980-09-25					74.3	2.6	0.3	0.03			
Yamashita-Hen-S	4S	6.1	73	87.3	69.9	6.2	1.1	1.48	25.9	1.5	
1980-09-25					83.1	6.3	1.0	3.37			
Shiogama-Kojyo-S	4S	6.7	60	114.9	161.1	18.6	2.6	8.07	173.3	5.4	
1978-02-20					223.9	9.2	0.9	19.41			
Hachinohe-S	3S	6.2	60	116.6	70.9	5.4	0.6	2.70	36.4	1.4	
1981-12-02					64.2	4.5	0.6	2.37			
Akita-S	4S	5.6	7	116.9	63.6	4.7	1.1	1.66	9.0	1.0	
1983-06-09					49.4	3.7	0.8	0.01			
Akita-S(A.S.)	4S	5.6	7	117.2	75.6	1.9	0.2	0.05	5.3	0.2	
1983-06-09					43.3	1.9	0.2	0.			
Aomori-S	4S	6.9	20	167.9	73.7	8.3	2.4	9.54	22.8	2.7	
1983-06-21					65.5	6.3	2.6	3.96			

	Hor Accel$_2$ cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur sec > .05g	Vert Accel$_2$ cm/sec^2	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel	Vert Displ cm
Data Units	120	120	120	118	55		55		55
Mean	63.56	6.31	2.81	2.23	29.30	0.46	2.62	0.41	1.36
S.D.	46.91	4.78	3.23	4.08	30.44	0.65	2.18	0.46	1.52
Mean + S.D.	110.47	11.10	6.04	6.31	59.74	0.54	4.80	0.43	2.88
Mean + 2 S.D.	157.38	15.88	9.27	10.39	90.18	0.57	6.98	0.44	4.40

MODIFIED MERCALLI INTENSITY VI (Concluded)

FAR FIELD

M = 6.9

SOFT SITE

Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec > .05g	Vert Accel cm/sec^2	Vert Vel cm/sec	Vert Displ cm	Vert Dur Sec > .05g	Hor Predom Period sec	Vert Predom Period sec	Type of Fault	Epicenter Location	JMI
2.42	2.12	0.0	4.79	1.11	1.06	0.0	1.39	1.46	Strike-	33°11'24" N	
3.18	1.38	0.0					1.62		slip	116°07'42" W	
4.5	0.8	0.05	12.4	1.0	0.3	0.	0.36	0.43		33.9° Lat.	
3.1	0.7	0.					0.56			135.4° Long.	
2.5	0.4	1.02	16.0	1.1	0.1	0.	0.27	0.43	Strike-	40.1° Lat.	
3.0	0.3	0.					0.42		slip	141.7° Long.	
2.2	0.9	2.12	23.9	1.0	0.1	0.	0.43	0.26		34.9° Lat.	
3.9	0.9	5.05					0.41			139.3° Long.	
4.5	1.1	5.51	35.9	1.6	0.1	0.	0.52	0.39		35.5° Lat.	
12.1	1.0	8.06					0.54			140.2° Long.	
4.5	0.5	0.87	24.9	1.5	0.2	0.	0.31	0.37		35.5° Lat.	
2.6	0.3	0.03					0.22			140.2° Long.	
4.1	1.1	1.48	25.9	1.6	0.1	0.	0.56	0.39		35.5° Lat.	
4.1	1.0	3.37					0.47			140.2° Long.	
3.9	2.6	8.07	173.3	5.4	0.4	15.41	0.73	0.74		38.7° Lat.	
4.3	0.9	19.41					0.26			142.2° Long.	
5.4	0.6	2.70	36.4	1.4	0.2	0.	0.48	0.34		40.9° Lat.	
4.5	0.6	2.37					0.44			142.6° Long.	
4.7	1.1	1.66	9.0	1.0	0.3	0.	0.47	0.20	Reverse	40.24° Lat.	
4.7	0.8	0.01					0.48			139.02° Long.	
1.9	0.2	0.05	5.3	0.2	0.0	0.	0.16	0.26	Reverse	40.27° Lat.	
1.8	0.2	0.					0.27			139.02° Long.	
5.3	2.4	9.54	22.8	2.7	0.6	0.	0.71	0.74	Reverse	41.35° Lat.	
6.3	2.6	3.96					0.60			139.1° Long.	

rt cel$_2$ sec^2	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel	Vert Displ cm	Ratio V/H Displ	Vert Dur sec > .05g	Ratio V/H Dur	Hor Predom Period sec	Vert Predom Period sec	Ratio V/H Predom Period
		55		55		54		120	55	
.30	0.46	2.62	0.41	1.36	0.48	0.65	0.29	0.85	0.82	0.96
.44	0.65	2.18	0.46	1.52	0.47	2.69	0.66	0.60	0.64	1.07
.74	0.54	4.80	0.43	2.88	0.48	3.34	0.53	1.44	1.46	1.01
.18	0.57	6.98	0.44	4.40	0.47	6.03	0.58	2.04	2.10	1.03

MODIFIED MERCALLI INTENSITY VI

FAR FIELD

M = 7.0 to 7.5

SOFT SITE

Earthquake	Site Classification	Mag M_S	Focal Depth km	Distance to Source km	Hor Accel$_2$ cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel cm/sec^2
Kushiro-S	3S	7.1	160	163.8	104.3	4.5	0.5	4.06	36.4
1965-10-26					73.1	3.4	0.5	0.13	
Kochi-S	4S	7.5	40	164.4	70.8	10.8	2.3	6.41	31.7
1968-04-01					109.0	15.7	3.4	10.13	
Aomori-S	4S	7.4	20	217.5	85.6	9.3	2.3	16.35	25.4
1968-05-16					103.7	9.1	1.9	14.91	
Kushiro-S	3S	7.0	60	183.3	102.8	6.6	1.2	6.05	30.4
1971-08-02					79.3	6.7	1.2	5.22	
Yamashita-Hen-S	4S	7.0	40	282.0	80.1	3.8	0.8	6.82	19.4
1972-02-29					60.8	3.6	0.5	5.40	
Yamashita-Hen-S	4S	7.3	30	326.4	40.7	3.0	0.4	0.	
1972-12-04					50.6	2.8	0.3	0.01	
Onahama-S	4S	7.4	30	202.2	55.8	6.2	1.5	8.37	27.9
1978-06-12					61.2	7.4	1.2	7.06	
Kashima-Zokan-S	3S	7.4	30	321.4	53.4	4.3	1.0	0.16	16.1
1978-06-12					39.1	3.9	0.9	0.	
Hachinohe-S	3S	7.4	30	294.5	79.4	7.8	1.5	12.68	36.
1978-06-12					72.7	8.2	1.7	13.64	
Shimizu-Miho-S	4S	7.0	0	93	50.8	5.8	3.0	0.03	18.7
1978-01-14					93.6	12.6	6.6	0.61	
Shimizu-Kojyo-S	4S	7.0	0	76	102.7	11.0	5.0	5.02	24.
1978-01-14					54.1	8.1	3.5	1.17	
Tomakomai-S	3S	7.1	130	139.3	167.0	14.4	3.4	5.87	39.
1981-01-23					169.5	8.6	1.8	3.41	

	Hor Accel$_2$ cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur sec ≥ .05g	Vert Accel cm/sec^2	Ratio V/H Accel
Data Units	24	24	24	24	11	
Mean	81.67	7.4	1.93	5.55	27.27	
S.D.	33.98	3.60	1.56	5.06	7.55	
Mean + S.D.	115.65	11.0	3.49	10.60	34.83	
Mean + 2 S.D.	149.64	14.60	5.05	15.66	42.38	

AD-A188 230 STATE-OF-THE-ART FOR ASSESSING EARTHQUAKE HAZARDS IN THE UNITED STATES RE..(U) ARMY ENGINEER WATERWAYS EXPERIMENT STATION VICKSBURG MS GEOTE.. 2/2

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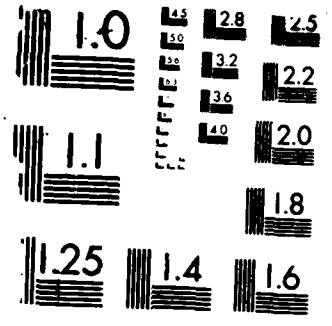

MICROCOPY RESOLUTION TEST CHART

MODIFIED MERCALLI INTENSITY VI

FAR FIELD

M = 7.0 to 7.5

SOFT SITE

Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel$_2$ cm/sec^2	Vert Vel cm/sec	Vert Displ cm	Vert Dur Sec ≥ .05g	Hor Predom Period sec	Vert Predom Period sec	Type of Fault	Epicenter Location	JMI
4.5	0.5	4.06	36.4	1.5	0.1	0.	0.27	0.27	R. Dip-	44.1° Lat.	IV
3.4	0.5	0.13					0.29		slip	145.7° Long.	
10.8	2.3	6.41	31.7	5.3	1.2	0.	0.96	1.05	R. Dip-	32.3° Lat.	IV
15.7	3.4	10.13					0.91		slip	132.6° Long.	
9.3	2.3	16.35	35.9	3.6	0.9	0.	0.68	0.63	Normal	41.4° Lat.	IV
9.1	1.9	14.91					0.55			143.3° Long.	
6.6	1.2	6.05	30.4	2.4	0.4	0.	0.40	0.49	N. Dip-	41.5° Lat.	IV
6.7	1.2	5.22					0.53		slip	143.4° Long.	
3.8	0.8	6.82	19.9	1.1	0.1	0.	0.30	0.36	R. Dip-	33.3° Lat.	IV
3.6	0.5	5.40					0.37		slip	141.3° Long.	
3.0	0.4	0.					0.46		R. Dip-	33.2° Lat.	IV
2.8	0.3	0.01					0.35		slip	141.0° Long.	
6.2	1.5	8.37	27.9	2.0	0.4	0.	0.69	0.45		38.1° Lat.	IV
7.4	1.2	7.06					0.76			142.4° Long.	
4.3	1.0	0.16	16.1	1.3	0.4	0.	0.51	0.51		38.1° Lat.	IV
3.9	0.9	0.					0.62			142.4° Long.	
7.8	1.5	12.68	36.0	2.9	0.5	0.	0.61	0.51		38.1° Lat.	IV
8.2	1.7	13.64					0.71			142.4° Long.	
5.8	3.0	0.03	16.7	2.9	1.2	0.	0.71	1.08		34.8° Lat.	IV
12.6	6.6	0.61					0.85			139.2° Long.	
11.0	5.0	5.02	23.9	3.1	0.8	0.	0.67	0.81		34.8° Lat.	IV
8.1	3.5	1.17					0.94			139.2° Long.	
14.4	3.4	5.87	25.1	1.7	0.4	0.	0.54	0.42		42.4° Lat.	
8.6	1.8	3.02					0.32			142.2° Long.	

ert ccel$_2$ /sec^2	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel	Vert Displ cm	Ratio V/H Displ	Vert Dur sec ≥ .05g	Ratio V/H Dur	Hor Predom Period sec	Vert Predom Period sec	Ratio V/H Predom Period
1		11		11		11		24	11	
.27	0.33	2.53	0.34	0.58	0.30	0.0	0.0	0.58	0.60	1.03
.55	0.22	1.22	0.34	0.39	0.25			0.21	0.27	1.28
4.83	0.30	3.75	0.34	0.97	0.28			0.79	0.87	1.10
2.38	0.28	4.98	0.34	1.36	0.27			1.01	1.14	1.13

MODIFIED MERCALLI INTENSITY VI

FAR FIELD

M = 7.5

SOFT SITE

Earthquake	Site Classification	Mag M_S	Focal Depth km	Distance to Source km	Hor Accl$_2$ cm/sec	Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel$_2$ cm/sec
Sakata-S	3S	7.7	13	183.5	51.6	13.5	10.8	0.02	17.9
1983-05-26					39.0	12.0	12.7	0.	

	Hor Accel$_2$ cm/sec	Hor Vel cm/sec	Hor Displ cm	Hor Dur sec ≥ .05g	Vert Accel$_2$ cm/sec	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel
Data Units	2	2	2	2	1		1	
Mean	45.3	12.75	11.75	0.01				
S.D.								
Mean + S.D.								
Mean + 2 S.D.								

MODIFIED MERCALLI INTENSITY VI

FAR FIELD

M = 7.5

SOFT SITE

Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel cm/sec^2	Vert Vel cm/sec	Vert Displ cm	Vert Dur Sec ≥ .05g	Hor Predom Period sec	Vert Predom Period sec	Type of Fault	Epicenter Location	JMI
13.5	10.8	0.02	17.9	4.2	2.5	0.	1.64	1.46	Reverse	40.4° Lat.	IV
12.0	12.7	0.					1.93			138.9° Long.	

Vert Accel cm/sec^2	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel	Vert Displ cm	Ratio V/H Displ	Vert Dur sec ≥ .05g	Ratio V/H Dur	Hor Predom Period sec	Vert Predom Period sec	Ratio V/H Predom Period
1		1		1		1		2	1	
								1.79		

MODIFIED MERCALLI INTENSITY VII

FAR FIELD

M = 6.9

HARD SITE

Earthquake	Site Classification	Mag M_S	Focal Depth km	Distance to Source km	Hor Accel$_2$ cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel$_2$ cm/sec^2
C.I.T. Cat.:									
A009	2H	6.5	16	43.4	155.7	35.6	14.2	10.04	41.9
					197.3	26.0	9.6	8.50	
E072	2H	6.6	13	41.6	82.2	20.8	14.7	7.76	64.8
					115.0	21.5	11.7	5.50	
E078	2H	6.6	13	44.4	126.5	23.2	13.7	5.26	67.2
					169.2	16.1	8.9	5.68	
F092	2H	6.6	13	45.0	64.2	13.8	10.3	2.56	48.7
					79.1	11.5	6.3	3.66	
N192	2H	6.6	13	42.7	96.7	14.8	7.7	6.70	42.5
					98.9	19.5	7.9	5.82	
Q241	2H	6.6	13	43.8	86.80	17.90	9.22	7.86	60.80
					138.00	19.60	9.98	5.66	
S255	2H	6.6	13	41.0	123.00	22.50	15.80	6.26	46.80
					128.00	21.90	10.90	8.46	
S262	2H	6.6	13	41.1	68.30	25.70	16.50	8.80	32.90
					93.60	27.80	13.70	4.10	
S265	2H	6.6	13	42.0	104.00	17.80	8.69	6.08	53.70
					125.00	18.20	12.60	10.30	
Miyako-S 1978-02-20	2H	6.7	60	119.5	131.1	3.4	0.1	20.99	63.3
					98.4	3.1	0.1	13.65	

	Hor Accel$_2$ cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur sec ≥ .05g	Vert Accel$_2$ cm/sec^2	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel
Data Units	20	20	20	20	10		10	
Mean	114.05	19.03	10.13	7.68	52.26	0.46	6.75	0.35
S.D.	34.01	7.62	4.45	4.04	11.53	0.34	2.41	0.32
Mean + S.D.	148.06	26.66	14.58	11.72	63.79	0.43	9.16	0.34
Mean + 2 S.D.	182.06	34.28	19.03	15.77	75.33	0.41	11.57	0.34

MODIFIED MERCALLI INTENSITY VII

FAR FIELD

M = 6.9

HARD SITE

Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel cm/sec^2	Vert Vel cm/sec	Vert Displ cm	Vert Dur Sec ≥ .05g	Hor Predom Period sec	Vert Predom Period sec	Type of Fault	Epicenter Location	JMI
35.6	14.2	10.04	41.9	7.6	3.9	0.0	1.44	1.14		32°38' N	
26.0	9.6	8.50					0.83			117°07' W	
20.8	14.7	7.76	64.8	6.9	3.2	1.70	1.59	0.67	Thrust	34°24' N	
21.5	11.7	5.50					1.17			118°23.7' W	
23.2	13.7	5.26	67.2	10.2	6.4		1.15	0.95	Thrust	34°24' N	
16.1	8.9	5.68					0.59			118°23.7' W	
13.8	10.3	2.56	48.7	7.1	3.8	0.0	1.35	0.92	Thrust	34°24' N	
11.5	6.3	3.66					0.91			118°23.7' W	
14.8	7.7	6.70	42.5	7.7	3.3	0.0	0.96	1.14	Thrust	34°24'42" N	
19.5	7.9	5.82					1.24			118°24'00" W	
17.90	9.22	7.86	60.80	8.73	5.08	0.16	1.29	0.90	Thrust	34°24'42" N	
19.60	9.98	5.66					0.89			118°24'00" W	
22.50	15.80	6.26	46.80	5.20	2.65	0.0	1.15	0.70	Thrust	34°24'42" N	
21.90	10.90	8.46					1.07			118°24'00" W	
25.70	16.50	8.80	32.90	6.17	2.74	0.0	2.36	1.18	Thrust	34°24'42" N	
27.80	13.70	4.10					1.87			118°24'00" W	
17.80	8.69	6.08	53.70	6.79	3.56	0.0	1.07	0.79	Thrust	34°24'42" N	
18.20	12.60	10.30					0.91			118°24'00" W	
3.4	0.1	20.99	63.3	1.1	0.0	3.99	0.16	0.11		38.7°Lat. N	
3.1	0.1	13.65					0.20			142.2°Long. E	

Vert Accel cm/sec^2	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel	Vert Displ cm	Ratio V/H Displ	Vert Dur sec ≥ .05g	Ratio V/H Dur	Hor Predom Period sec	Vert Predom Period sec	Ratio V/H Predom Period
10		10		10		9		20	10	
52.26	0.46	6.75	0.35	3.46	0.34	0.65	0.08	1.11	0.85	0.76
11.53	0.34	2.41	0.32	1.66	0.37	1.37	0.34	0.50	0.31	0.62
43.79	0.43	9.16	0.34	5.12	0.35	2.02	0.17	1.61	1.16	0.72
75.33	0.41	11.57	0.34	6.78	0.36	3.39	0.21	2.12	1.48	0.70

MODIFIED MERCALLI INTENSITY VII

FAR FIELD

M = 7.0 to 7.5

HARD SITE

Earthquake	Site Classification	Mag M_S	Focal Depth km	Distance to Source km	Hor Accel$_2$ cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel$_2$ cm/sec^2	Ve V cm
Miyako-S	2H	7.4	30	152.9	249.0	7.3	1.0	40.07	113.4	2
1978-06-12					175.8	6.1	0.5	39.13		

	Hor Accel$_2$ cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur sec ≥ .05g	Vert Accel$_2$ cm/sec^2	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel
Data Units	2	2	2	2	1		1	
Mean	212.4	6.7	0.75	39.6				
S.D.								
Mean + S.D.								
Mean + 2 S.D.								

MODIFIED MERCALLI INTENSITY VII

FAR FIELD

M = 7.0 to 7.5

HARD SITE

cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel cm/sec^2	Vert Vel cm/sec	Vert Displ cm	Vert Dur Sec ≥ .05g	Hor Predom Period sec	Vert Predom Period sec	Type of Fault	Epicenter Location	JMI
0	7.3	1.0	40.07	113.4	2.6	0.4	14.80	0.19	0.15		38.1° Lat.	IV
8	6.1	0.5	39.13					0.22			142.4° Long.	

Vert Accel cm/sec^2	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel	Vert Displ cm	Ratio V/H Displ	Vert Dur sec ≥ .05g	Ratio V/H Dur	Hor Predom Period sec	Vert Predom Period sec	Ratio V/H Predom Period
1		1		1		1		2	1	
								0.20		

MODIFIED MERCALLI INTENSITY VII

FAR FIELD

M = 7.5

HARD SITE

Earthquake	Site Classification	Mag M_S	Focal Depth km	Distance to Source km	Hor Accel$_2$ cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel$_2$ cm/sec^2	Ve V cm
Murroran-S	2H	7.8	20	290.0	272.4	33.1	14.5	50.21	112.4	6
1968-05-16					430.9	17.2	7.0	36.35		
Miyako-S	2H	7.8	20	189.1	176.9	7.0	2.6	96.93	62.4	2
1968-05-16					241.1	5.8	1.5	97.22		

	Hor Accel$_2$ cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur sec ≥ .05g	Vert Accel$_2$ cm/sec^2	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel
Data Units	4	4	4	4	2		2	
Mean	280.32	15.77	6.4	70.18	87.4	0.31	4.05	0.26
S.D.								
Mean + S.D.								
Mean + 2 S.D.								

MODIFIED MERCALLI INTENSITY VII

FAR FIELD

M = 7.5

HARD SITE

Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel cm/sec^2	Vert Vel cm/sec	Vert Displ cm	Vert Dur Sec ≥ .05g	Hor Predom Period sec	Vert Predom Period sec	Type of Fault	Epicenter Location	JMI
33.1	14.5	50.21	112.4	6.0	1.8	19.27	0.76	0.33	Normal	40.7° Lat.	
17.2	7.0	36.35					0.25			143.7° Long.	
7.0	2.6	96.93	62.4	2.1	0.8	69.02	0.25	0.21	Normal	40.7° Lat.	
5.8	1.5	97.22					0.15			143.7° Long.	

ert Accel cm/sec^2	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel	Vert Displ cm	Ratio V/H Displ	Vert Dur sec ≥ .05g	Ratio V/H Dur	Hor Predom Period sec	Vert Predom Period sec	Ratio V/H Predom Period
2		2		2		2		4	2	
87.4	0.31	4.05	0.26	1.3	0.20	44.14	0.63	0.35	0.27	0.77

MODIFIED MERCALLI INTENSITY VII

FAR FIELD

M = 6.9

SOFT SITE

Earthquake	Site Classification	Mag M_S	Focal Depth km	Distance to Source km	Hor Accel cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel cm/sec^2	Ve V cm
C.I.T. Cat.:										
A018	3S	5.6	11	41.5	63.4	7.8	2.8	10.00	49.1	4
					175.7	17.1	8.8	9.04		
B031	3S	5.9			63.9	5.8	1.7	0.02	35.5	2
					66.8	3.6	1.1	0.02		
B032	3S	6.5	60	85.6	134.2	8.0	2.7	10.18	59.9	3
					194.3	12.7	3.8	9.20		
C051	3S	6.6	13	44.7	97.8	17.1	9.2	8.16	48.0	7
					122.7	21.9	11.6	6.16		
C054	3S	6.6	13	43.9	147.1	17.4	11.8	5.52	51.7	10
					117.0	17.3	11.8	9.92		
D057	3S	6.6	13	39.3	103.8	17.0	8.6	9.70	49.8	6
					148.2	19.4	13.1	7.74		
D058	3S	6.6	13	39.3	167.3	16.5	8.0	5.98	87.0	5
					207.0	21.1	14.7	7.72		
D059	3S	6.6	13	41.9	133.8	9.6	7.5	6.14	66.7	4
					147.1	16.7	12.2	6.80		
D062	3S	6.6	13	44.7	118.0	16.1	12.0	6.68	74.6	9
					130.0	17.6	6.9	6.68		
D065	3S		13	42.0	146.7	18.0	10.3	5.78	73.1	9
					155.7	22.1	12.9	6.06		
E075	3S	6.6	13	42.1	133.8	22.3	11.4	5.10	47.3	7
					111.8	18.5	11.6	10.44		
E083	3S	6.6	13	42.0	158.2	18.3	9.0	12.32	55.5	8
					161.9	16.5	10.3	12.60		
F089	3S	6.6	13	45.9	131.9	20.8	14.5	6.52	75.3	9
					139.0	20.7	11.6	9.76		
F095	3S	6.6	13	39.6	96.2	16.8	10.6	4.70	26.5	6
					83.9	17.9	12.1	5.96		
F098	3S	6.6	13	44.6	236.4	21.8	13.2	7.56	69.2	9
					192.0	18.5	13.4	9.80		
F105	3S	6.6	13	40.8	83.1	8.3	4.0	3.76	67.1	4
					77.6	8.5	4.9	1.86		
G107	3S	6.6	13	41.9	93.5	7.9	3.0	6.42	92.9	6
					107.3	14.3	7.3	7.92		
G108	3S	6.6	13	41.9	198.0	9.8	2.7	*	91.2	8
					181.6	16.3	6.9	*		
G112	3S	6.6	13	42.5	101.9	17.0	11.0	7.42	53.2	9
					78.5	15.7	9.2	4.00		
H121	3S	6.6	13	43.1	119.4	17.1	8.6	9.10	79.2	8
					112.3	10.5	4.4	6.38		
I134	3S	6.6	13	41.0	97.9	16.7	11.3	5.12	62.5	5
					82.3	10.7	6.2	5.54		
J148	3S	6.6	13	42.0	107.6	16.2	7.3	6.94	51.6	6
					112.0	17.5	11.1	10.24		
M176	3S	6.6	13	44.8	83.4	20.9	13.7	7.90	41.6	8
					116.0	17.7	13.7	7.06		
N188	3S	6.6	13	41.0	114.4	17.0	10.8	5.22	62.5	5
					126.5	12.1	5.4	9.46		
O199	3S	6.6	13	44.0	137.0	17.60	9.78	*	148.0	10
					238.0	21.30	10.30	*		

* = No data

MODIFIED MERCALLI INTENSITY VII

FAR FIELD

M = 6.9

SOFT SITE

Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel cm/sec^2	Vert Vel cm/sec	Vert Displ cm	Vert Dur Sec ≥ .05g	Hor Predom Period sec	Vert Predom Period sec	Type of Fault	Epicenter Location	JMI
7.8	2.8	10.00	49.1	4.7	2.2	0.0	0.77	0.60	Strike-	36°40' N	
17.1	8.8	9.04					0.61		slip	121°18' W	
5.8	1.7	0.02	35.5	2.4	2.9	0.0	0.57	0.42		35°00' N	
3.6	1.1	0.02					0.34			119°01' W	
8.0	2.7	10.18	59.9	3.0	1.7	1.12	0.37	0.31	N. Dip-	47°24' N	
12.7	3.8	9.20					0.41		slip	122°18" W	
17.1	9.2	8.16	48.0	7.8	5.8	0.0	1.10	1.02	Thrust	34°24' N	
21.9	11.6	6.16					1.12			118°23'42" W	
17.4	11.8	5.52	51.7	10.7	5.1	0.0	0.74	1.30	Thrust	34°24' N	
17.3	11.8	9.92					0.93			118°23'42" W	
17.0	8.6	9.70	49.8	6.0	3.8	0.0	1.03	0.75	Thrust	34°24' N	
19.4	13.1	7.74					0.82			118°23.7' W	
16.5	8.0	5.98	87.0	5.0	3.0	6.00	0.62	0.36	Thrust	34°24' N	
21.1	14.7	7.72					0.64			118°23.7' W	
9.6	7.5	6.14	66.7	4.8	2.5		0.45	0.45	Thrust	34°24' N	
16.7	12.2	6.80					0.71			118°23.7' W	
16.1	12.0	6.68	74.6	9.0	4.1		0.86	0.76	Thrust	34°24' N	
17.6	6.9	6.68					0.85			118°23.7' W	
18.0	10.3	5.78	73.1	9.0	4.9	2.56	0.77	0.77	Thrust	34°24' N	
22.1	12.9	6.06					0.89			118°23.7' W	
22.3	11.4	5.10	47.3	7.3	3.9	0.0	1.05	0.97	Thrust	34°24' N	
18.5	11.6	10.44					1.04			118°23.7' W	
18.3	9.0	12.32	55.5	8.8	4.4	0.02	0.73	0.99	Thrust	34°24' N	
16.5	10.3	12.60					0.64			118°23.7' W	
20.8	14.5	6.52	75.3	9.9	6.0	2.96	0.99	0.83	Thrust	34°24' N	
20.7	11.6	9.76					0.94			118°23.7' W	
16.8	10.6	4.70	26.5	6.2	3.9	0.0	1.09	1.47	Thrust	34°24' N	
17.9	12.1	5.96					1.34			118°23.7' W	
21.8	13.2	7.56	69.2	9.6	5.3	4.68	0.58	0.87	Thrust	34°24' N	
18.5	13.4	9.80					0.60			118°23.7' W	
8.3	4.0	3.76	67.1	4.5	2.9	5.40	0.68	0.42	Thrust	34°24' N	
8.5	4.9	1.86					0.69			118°23.7' W	
7.9	3.0	6.42	92.9	6.6	2.6	0.56	0.53	0.45	Thrust	34°24'42" N	
14.3	7.3	7.92					0.84			118°24'00" W	
9.8	2.7	*	91.2	8.7	2.4		0.31	0.60	Thrust	34°24'42" N	
16.3	6.9	*					0.56			118°24'00" W	
17.0	11.0	7.42	53.2	9.9	5.2	1.30	1.05	1.17	Thrust	34°24'42" N	
15.7	9.2	4.00					1.26			118°24'00" W	
17.1	8.6	9.10	79.2	8.2	3.4	4.86	0.90	0.65	Thrust	34°24'42" N	
10.5	4.4	6.38					0.58			118°24'00" W	
16.7	11.3	5.12	62.5	5.7	2.5	0.30	1.07	0.57	Thrust	34°24'42" N	
10.7	6.2	5.54					0.82			118°24'00" W	
16.2	7.3	6.94	51.6	6.7	3.4	0.0	0.94	0.82	Thrust	34°24' N	
17.5	11.1	10.24					0.98			118°23'42" W	
20.9	13.7	7.90	41.6	8.9	4.3	0.0	1.57	1.34	Thrust	34°24' N	
17.7	13.7	7.06					0.96			118°23'42" W	
17.0	10.8	5.22	62.5	5.0	2.4	5.08	0.93	0.50	Thrust	34°24'42" N	
12.1	5.4	9.46					0.60			118°24'00" W	
17.60	9.78	*	148.0	10.40	5.74		0.81	0.44	Thrust	34°24'42" N	
21.30	10.30	*					0.56			118°24'00" W	

MODIFIED MERCALLI INTENSITY VII (Concluded)

FAR FIELD

M = 6.9

SOFT SITE

Earthquake	Site Classification	Mag M_S	Focal Depth km	Distance to Source km	Hor Accel$_2$ cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel$_2$ cm/sec^2	Vert Vel cm/s
P217	3S	6.6	13	42.0	108.00	14.70	9.94	5.52	60.10	7.0
					88.10	16.10	9.09	5.32		
Q239	3S	6.6	13	40.1	119.00	17.20	9.79	11.40	40.50	7.1
					161.00	19.10	11.60	7.98		
R244	3S	6.6	13	43.9	149.00	18.30	9.80	8.16	43.20	8.5
					126.00	18.70	9.93	9.54		
R249	3S	6.6	13	41.3	79.80	16.20	11.40	4.24	57.30	4.5
					84.10	10.00	7.34	6.10		
R251	3S	6.6	13	43.8	195.00	16.70	8.93	7.64	67.50	7.7
					188.00	18.70	9.49	6.76		
R253	3S	6.6	13	44.9	242.00	19.20	11.40	8.40	81.60	9.8
					220.00	18.00	12.40	10.76		
S258	3S	6.6	13	46.4	56.30	17.20	10.30	4.02	54.50	7.1
					83.30	18.50	10.50	2.48		
S261	3S	6.6	13	41.7	97.70	18.30	12.20	6.82	64.00	4.9
					107.00	11.20	5.92	4.78		
S266	3S	6.6	13	42.0	153.00	17.50	8.04	5.76	54.20	7.0
					129.00	21.40	11.60	10.30		
U301	3S	5.3	16	33.4	193.00	11.70	1.40	3.64	69.50	3.6
					119.00	8.26	1.71	5.00		
U309	3S	5.7	11	41.5	168.00	10.80	3.00	8.60	60.20	4.2
					74.90	6.28	1.77	0.56		
V314	3S	6.3	10	55.8	62.30	17.30	8.21	(10.38)	63.60	9.0
					95.60	23.60	16.30	(12.56)		
Kinuura-S 1971-01-05	4S	6.1	40	59.4	89.4	9.5	1.1	4.44	33.8	2.0
					93.1	6.3	0.6	5.12		
Tagonoura-S 1980-06-29	4S	6.7	10	73.6	56.4	4.1	0.8	0.02	36.3	1.3
					33.6	2.4	0.6	0.		

( ) = WES recalculated value

	Hor Accel$_2$ cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur sec ≥ .05g	Vert Accel$_2$ cm/sec^2	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel	V D
Data Units	78	78	78	74	39		39		3
Mean	125.97	15.32	8.54	6.79	61.67	0.49	6.75	0.44	
S.D.	46.22	4.97	4.02	2.96	21.16	0.46	2.48	0.50	
Mean + S.D.	172.18	20.29	12.56	9.75	82.84	0.48	9.23	0.45	
Mean + 2 S.D.	218.40	25.26	16.58	12.71	104.00	0.48	11.70	0.46	

MODIFIED MERCALLI INTENSITY VII (Concluded)

FAR FIELD

M = 6.9

SOFT SITE

Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel cm/sec^2	Vert Vel cm/sec	Vert Displ cm	Vert Dur Sec ≥ .05g	Hor Predom Period sec	Vert Predom Period sec	Type of Fault	Epicenter Location	JMI
14.70	9.94	5.52	60.10	7.07	4.61	3.00	0.85	0.74	Thrust	34°24'42" N	
16.10	9.09	5.32					1.15			118°24'00" W	
17.20	9.79	11.40	40.50	7.16	2.88	0.0	0.91	1.11	Thrust	34°24'42" N	
19.10	11.60	7.98					0.74			118°24'00" W	
18.30	9.80	8.16	43.20	8.50	4.36	0.0	0.77	1.24	Thrust	34°24'42" N	
18.70	9.93	9.54					0.89			118°24'00" W	
16.20	11.40	4.24	57.30	4.56	2.03	0.0	1.27	0.50	Thrust	34°24'42" N	
10.00	7.34	6.10					0.75			118°24'00" W	
16.70	8.93	7.64	67.50	7.78	4.75		0.54	0.72	Thrust	34°24'42" N	
18.70	9.49	6.76					0.62			118°24'00" W	
19.20	11.40	8.40	81.60	9.88	5.40	1.40	0.49	0.76	Thrust	34°24'42" N	
18.00	12.40	10.76					0.51			118°24'00" W	
17.20	10.30	4.02	54.50	7.14	3.56	0.0	1.92	0.82	Thrust	34°24'42" N	
18.50	10.50	2.48					1.39			118°24'00" W	
18.30	12.20	6.82	64.00	4.95	2.26	4.50	1.18	0.49	Thrust	34°24'42" N	
11.20	5.92	4.78					0.66			118°24'00" W	
17.50	8.04	5.76	54.20	7.08	3.15	2.30	0.72	0.82	Thrust	34°24'42" N	
21.40	11.60	10.30					1.04			118°24'00" W	
11.70	1.40	3.64	69.50	3.63	0.96	0.02	0.38	0.33	Thrust	37°06' N	
8.26	1.71	5.00					0.44			121°18' W	
10.80	3.00	8.60	60.20	4.23	1.99		0.40	0.44	Thrust	36°30' N	
6.28	1.77	0.56					0.52			121°18' W	
17.30	8.21	(10.38)	63.60	9.07	5.72		1.74	0.89	Strike-	33°37' N	
23.60	16.30	(12.56)					1.55		slip	117°58' W	
9.5	1.1	4.44	33.8	2.0	0.2	0.	0.67	0.37	N.Strike-	34.4° Lat.	
6.3	0.6	5.12					0.42		slip	137.2° Long.	
4.1	0.8	0.02	36.3	1.3	0.3	0.	0.45	0.22		34.92° Lat.	IV
2.4	0.6	0.					0.45			139.23° Long.	

Vert Accel cm/sec^2	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel	Vert Displ cm	Ratio V/H Displ	Vert Dur sec ≥ .05g	Ratio V/H Dur	Hor Predom Period sec	Vert Predom Period sec	Ratio V/H Predom Period
39		39		39		32		78	39	
61.67	0.49	6.75	0.44	3.50	0.41	1.44	0.21	0.82	0.72	0.88
21.16	0.46	2.48	0.50	1.51	0.37	2.01	0.68	0.33	0.31	0.94
82.84	0.48	9.23	0.45	5.01	0.40	3.45	0.35	1.14	1.04	0.91
104.00	0.48	11.70	0.46	6.52	0.39	5.46	0.43	1.47	1.35	0.92

MODIFIED MERCALLI INTENSITY VII

FAR FIELD

M = 7.0 to 7.5

SOFT SITE

Earthquake	Site Classification	Mag M_S	Focal Depth km	Distance to Source km	Hor Accel$_2$ cm/sec	Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel$_2$ cm/sec
Hososhima-S	4S	7.5	40	127.5	149.3	6.8	0.6	9.07	77.4
1968-04-01					177.3	6.9	0.8	15.42	
Niigata:Akita	4S	7.5	40	126.5	135.40	10.67		20.58	45.87
1964-06-16					157.97	11.85		24.96	
San Juan									
Argentina	3S	7.4	30	90.1	186.9	15.57		47	150.5
1977-11-23					189.5	20.59		48	

	Hor Accel$_2$ cm/sec	Hor Vel cm/sec	Hor Displ cm	Hor Dur sec ≥ .05g	Vert Accel$_2$ cm/sec	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel
Data Units	6	6	2	6	3		3	
Mean	166.06	12.06	0.7	27.50	91.26	0.55	7.78	0.64
S.D.	21.89	5.32		16.37				
Mean + S.D.	187.95	17.38		43.88				
Mean + 2 S.D.	209.85	22.70		60.25				

MODIFIED MERCALLI INTENSITY VII

FAR FIELD

M = 7.0 to 7.5

SOFT SITE

Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel cm/sec^2	Vert Vel cm/sec	Vert Displ cm	Vert Dur Sec ≥ .05g	Hor Predom Period sec	Vert Predom Period sec	Type of Fault	Epicenter Location	JMI
6.8	0.6	9.07	77.4	4.8	0.7	7.85	0.28	0.39	R. Dip-	32.3° Lat.	
6.9	0.8	15.42					0.25		slip	132.6° Long.	
10.67		20.58	45.87	4.56		0.0				38.4° N	
11.85		24.96								139.2° E	
15.57		47	150.5	13.98							
20.59		48									

[illegible]	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel	Vert Displ cm	Ratio V/H Displ	Vert Dur sec ≥ .05g	Ratio V/H Dur	Hor Predom Period sec	Vert Predom Period sec	Ratio V/H Predom Period
		3		1		2		2	1	
[illegible]	0.55	7.78	0.64			3.92	0.14	0.26		

MODIFIED MERCALLI INTENSITY VII

FAR FIELD

M = 7.5

SOFT SITE

Earthquake	Site Classification	Mag M_S	Focal Depth km	Distance to Source km	Hor Accel$_2$ cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel$_2$ cm/sec^2	V c
Aomori-S	4S	7.7	13	163.5	168.0	25.6	17.9	45.40		
1983-05-26					121.5	19.9	9.7	40.48		
C.I.T. Cat:										
A003	3S	7.7	16	127.0	46.5	6.2	2.7	0.0	29.3	
					52.1	9.1	2.9	0.0		
A005	3S	7.7	16	90.9	87.8	11.8	4.6	13.64	43.6	
					128.6	19.3	5.8	8.62		
A006	3S	7.7	16	120.6	54.1	6.1	5.1	0.0	22.5	
					43.5	9.4	5.9	0.0		
A007	3S	7.7	16	120.6	58.1	6.6	4.5	0.0	20.3	
					41.2	8.9	6.4	0.0		

	Hor Accel$_2$ cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur sec ≥ .05g	Vert Accel$_2$ cm/sec^2	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel
Data Units	10	10	10	10	4		4	
Mean	80.14	12.29	6.55	10.81	28.92	0.36	4.17	0.34
S.D.	44.44	6.85	4.45	17.61				
Mean + S.D.	124.58	19.14	11.00	28.42				
Mean + 2 S.D.	169.03	25.99	15.44	46.03				

MODIFIED MERCALLI INTENSITY VII

FAR FIELD

M = 7.5

SOFT SITE

Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel cm/sec^2	Vert Vel cm/sec	Vert Displ cm	Vert Dur Sec ≥ .05g	Hor Predom Period sec	Vert Predom Period sec	Type of Fault	Epicenter Location	JMI
25.6	17.9	45.40					0.96		Reverse	40.4° Lat.	IV
19.9	9.7	40.48					1.03			138.9° Long.	
6.2	2.7	0.0	29.3	4.5	3.0	0.0	0.84	0.97	Thrust	35°00' N	
9.1	2.9	0.0					1.10			119°02' W	
11.8	4.6	13.64	43.6	5.0	2.2	0.0	0.85	0.72	Thrust	35°00' N	
19.3	5.8	8.62					0.94			119°02' W	
6.1	5.1	0.0	22.5	4.2	2.2	0.0	0.71	I.17	Thrust	35°00' N	
9.4	5.9	0.0					1.36			119°02' W	
6.6	4.5	0.0	20.3	3.0	3.4	0.0	0.71	0.93	Thrust	35°00' N	
8.9	6.4	0.0					1.36			119°02' W	

Vert Accel cm/sec^2	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel	Vert Displ cm	Ratio V/H Displ	Vert Dur sec ≥ .05g	Ratio V/H Dur	Hor Predom Period sec	Vert Predom Period sec	Ratio V/H Predom Period
4		4		4		4		10	4	
8.92	0.36	4.17	0.34	2.7	0.41	0.0		0.98	0.95	0.97
								0.23		
								1.22		
								1.45		

MODIFIED MERCALLI INTENSITY VIII

FAR FIELD

M = 6.9

HARD SITE

Earthquake	Site Classification	Mag M_S	Focal Depth km	Distance to Source km	Hor Accel$_2$ cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel$_2$ cm/sec^2	Ve Ve cm/
Ofunato-Bochi-S 1978-02-20	1H	6.7	60	83.3	128.7	3.3	0.2	6.47	49.5	1

	Hor Accel$_2$ cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur sec ≥ .05g	Vert Accel$_2$ cm/sec^2	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel
Data Units	1	1	1	1	1		1	
Mean								
S.D.								
Mean + S.D.								
Mean + 2 S.D.								

MODIFIED MERCALLI INTENSITY VIII

FAR FIELD

M = 6.9

HARD SITE

Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel cm/sec^2	Vert Vel cm/sec	Vert Displ cm	Vert Dur Sec ≥ .05g	Hor Predom Period sec	Vert Predom Period sec	Type of Fault	Epicenter Location	JMI
3.3	0.2	6.47	49.5	1.6	0.1	0.	0.16	0.20		38.7°Lat.N 142.2°Long.E	

ert Accel cm/sec^2	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel	Vert Displ cm	Ratio V/H Displ	Vert Dur sec ≥ .05g	Ratio V/H Dur	Hor Predom Period sec	Vert Predom Period sec	Ratio V/H Predom Period
		1		1		1		1	1	

MODIFIED MERCALLI INTENSITY VIII

FAR FIELD

M = 7.0 to 7.5

HARD SITE

Earthquake	Site Classification	Mag M_S	Focal Depth km	Distance to Source km	Hor Accel$_2$ cm/sec	Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel$_2$ cm/sec
Ofunato-Bochi-S 1978-06-12	1H	7.4	30	123.6	220.9 275.2	11.1 14.6	1.5 3.8	11.32 20.24	86.1

MODIFIED MERCALLI INTENSITY VIII

FAR FIELD

M = 7.0 to 7.5

HARD SITE

Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel cm/sec^2	Vert Vel cm/sec	Vert Displ cm	Vert Dur Sec ≥ .05g	Hor Predom Period sec	Vert Predom Period sec	Type of Fault	Epicenter Location	JMI
11.1	1.5	11.32	86.1	4.2	0.5	7.35	0.32	0.31		38.15° Lat.	V
14.6	3.8	20.24					0.33			142.4° Long.	

MODIFIED MERCALLI INTENSITY VIII

FAR FIELD

M = 6.9

SOFT SITE

Earthquake	Site Classification	Mag M_S	Focal Depth km	Distance to Source km	Hor Accel$_2$ cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel$_2$ cm/sec^2	Vert Vel cm/se
C.I.T. Cat.: U299	3S	5.9			233.00	21.70	3.74	3.14	68.50	3.6
					172.00	21.60	3.92	1.54		

	Hor Accel$_2$ cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur sec ≥ .05g	Vert Accel$_2$ cm/sec^2	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel
Data Units	2	2	2	2	1		1	
Mean	202.5	21.65	3.83	2.34				
S.D.								
Mean + S.D.								
Mean + 2 S.D.								

MODIFIED MERCALLI INTENSITY VIII

FAR FIELD

M = 6.9

SOFT SITE

Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel cm/sec^2	Vert Vel cm/sec	Vert Displ cm	Vert Dur Sec ≥ .05g	Hor Predom Period sec	Vert Predom Period sec	Type of Fault	Epicenter Location	JMI
21.70	3.74	3.14	68.50	3.64	2.59		0.58	0.33		34°22' N	
21.60	3.92	1.54					0.79			119°35' W	

ert cel m/sec^2	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel	Vert Displ cm	Ratio V/H Displ	Vert Dur sec ≥ .05g	Ratio V/H Dur	Hor Predom Period sec	Vert Predom Period sec	Ratio V/H Predom Period
		1		1				2	1	
								0.68		

MODIFIED MERCALLI INTENSITY VIII

FAR FIELD

M = 7.0 to 7.5

SOFT SITE

Earthquake	Site Classification	Mag M_S	Focal Depth km	Distance to Source km	Hor Accel$_2$ cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel$_2$ cm/sec^2	Vert Vel cm/sec
Kushiro-S	3S	7.4	40	132.2	218.8	27.7	7.9	42.64	60.3	6.7
1973-06-17					131.1	15.5	2.8	38.27		
Kushiro-S	3S	7.1	30	172.8	76.1	5.4	1.8	3.23	21.0	2.9
1973-06-24					55.1	5.6	1.0	3.41		
Shiogama-Kojyo-S	4S	7.4	30	150.0	335.3	29.2	6.5	28.89	251.6	15.1
1978-06-12					288.6	51.9	9.2	26.53		
Yamashita-Hen	4S	7.0	14	100.9	53.8	5.5	5.3	5.46	15.6	1.7
1978-01-14					62.8	3.5	2.8	5.06		
Bucharest-Romania	3S	7.2	100	193.8	201.75	75.11		(14.7)	107.05	12.50
1977-04-03					174.54	32.62		*		
Tohoku University	3S	7.4	30	118.8	259.23	36.17		*	153.04	11.92
GL Sendai					202.57	27.57		*		
1978-06-12										
C.I.T. Cat.: B028	3S	7.1	70	90.8	66.5	8.2	2.4	14.32	22.0	2.4
					65.9	7.9	2.7	0.92		

* = No data

( ) = WES recalculated value

	Hor Accel$_2$ cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur sec ≥ .05g	Vert Accel$_2$ cm/sec^2	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel	Ver Dis cm
Data Units	14	14	10	11	7		7		5
Mean	156.58	23.70	4.24	16.67	90.08	0.57	7.60	0.32	1.
S.D.	96.63	20.93	2.80	15.04	87.73	0.91	5.53	0.26	0.
Mean + S.D.	253.20	44.63	7.04	31.71	177.82	0.70	13.13	0.29	2.
Mean + 2 S.D.	349.83	65.56	9.84	46.75	265.55	0.76	18.67	0.28	2.

MODIFIED MERCALLI INTENSITY VIII

FAR FIELD

M = 7.0 to 7.5

SOFT SITE

Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel$_2$ cm/sec^2	Vert Vel cm/sec	Vert Displ cm	Vert Dur Sec ≥ .05g	Hor Predom Period sec	Vert Predom Period sec	Type of Fault	Epicenter Location	JMI
27.7	7.9	42.64	60.3	6.7	1.3	0.99	0.79	0.699	Thrust	42.9° Lat.	
15.5	2.8	38.27					0.74		Benioff Zone	146.0° Long.	
5.4	1.8	3.23	21.0	2.9	1.2	0.	0.44	0.86		42.9° Lat.	
5.6	1.0	3.41					0.64			146.5° Long.	
29.2	6.5	28.89	251.6	15.1	2.1	27.19	0.55	0.38		38.1° Lat.	V
51.9	9.2	26.53					1.13			142.4° Long.	
5.5	5.3	5.46	15.6	1.7	0.5	0.	0.64	0.68		34.8° Lat.	
3.5	2.8	5.06					0.35			139.2° Long.	
75.11		(14.7)	107.05	12.50							
32.62		*									
36.17		*	153.04	11.92							
27.57		*									
8.2	2.4	14.32	22.0	2.4	2.3	0.0	0.77	0.68	Thrust	46°06' N	
7.9	2.7	0.92					0.75			122°42' W	

ert ccel$_2$ /sec^2	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel	Vert Displ cm	Ratio V/H Displ	Vert Dur sec ≥ .05g	Ratio V/H Dur	Hor Predom Period sec	Vert Predom Period sec	Ratio V/H Predom Period
		7		5		5		10	5	
0.08	0.57	7.60	0.32	1.48	0.35	5.64	0.34	0.68	0.66	0.97
7.73	0.91	5.53	0.26	0.73	0.26	12.06	0.80	0.21	0.17	0.81
7.92	0.70	13.13	0.29	2.21	0.31	17.69	0.56	0.89	0.83	0.93
5.55	0.76	18.67	0.28	2.94	0.30	29.75	0.64	1.11	1.01	0.91

MODIFIED MERCALLI INTENSITY VIII

FAR FIELD

M = 7.5

SOFT SITE

Earthquake	Site Classification	Mag M_S	Focal Depth km	Distance to Source km	Hor Accel$_2$ cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel$_2$ cm/sec^2	Vert Vel cm/sec
Aomori-S	4S	7.8	20	242.9	291.7	39.1	19.6	76.47	160.2	14.3
1968-05-16					198.8	31.3	18.4	105.99		
Hachinohe-S	3S	7.8	20	188.1	331.9	35.9	10.2	70.38	144.5	11.3
1968-05-16					199.6	38.1	17.2	59.22		
Akita-S	4S	7.7	13	124.7	219.1	28.6	16.0	61.55	54.4	8.7
1983-05-26					235.3	31.7	17.2	62.33		

	Hor Accel$_2$ cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur sec ≥ .05g	Vert Accel$_2$ cm/sec^2	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel	Vert Displ cm
Data Units	6	6	6	6	3		3		3
Mean	246.07	34.12	16.43	72.66	119.7	0.49	11.43	0.33	5.9
S.D.	54.20	4.20	3.29	17.56					
Mean + S.D.	300.26	38.31	19.72	90.21					
Mean + 2 S.D.	354.46	42.51	23.01	107.77					

MODIFIED MERCALLI INTENSITY VIII

FAR FIELD

M = 7.5

SOFT SITE

Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel cm/sec^2	Vert Vel cm/sec	Vert Displ cm	Vert Dur Sec ≥ .05g	Hor Predom Period sec	Vert Predom Period sec	Type of Fault	Epicenter Location	MMI
39.1	19.6	76.47	160.2	14.3	5.9	61.02	0.84	0.56	Normal	[illegible] Lat.	
31.3	18.4	105.99					0.99			143.[illegible] Long.	
35.9	10.2	70.38	144.5	11.3	6.6	63.37	0.68	0.49	Normal	[illegible] Lat.	
38.1	17.2	59.22					1.20			143.[illegible] Long.	
28.6	16.0	61.55	54.4	8.7	5.2	12.46	0.82	1.01	Reverse	40.4° Lat.	V
31.7	17.2	62.33					0.85			138.9° Long.	

Vert Accel cm/sec^2	Ratio V/H Accel	Vert Vel cm/sec	Ratio V/H Vel	Vert Displ cm	Ratio V/H Displ	Vert Dur sec ≥ .05g	Ratio V/H Dur	Hor Predom Period sec	Vert Predom Period sec	Ratio V/H Predom Period
3		3		3		3		6	3	
19.7	0.49	11.43	0.33	5.9	0.36	45.62	0.63	0.89	0.69	0.77
								0.18		
								1.07		
								1.25		

MODIFIED MERCALLI INTENSITY NOT DESIGNATED

Earthquake	Site Classification	Mag M_S	Focal Depth km	Distance to Source km	Hor Accel$_2$ cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel$_2$ cm/sec^2	Vert Vel cm/sec
El Centro, Array 1, Borchard Ranch 10-15-79	S	6.6	12	38.9	136.23 139.35	11.23 14.54	4.9 5.5	8.63 10.44	43.21	3.56
El Centro, Array 2, Keystone Rd. 10-15-79	S	6.6	12	33.2	405.49 309.30	26.51 31.21	13.0 9.9	13.08 12.16	108.26	6.68
El Centro, Array 3, Pine Union Sch. 10-15-79	S	6.6	12	30.5	218.13 261.74	36.80 46.32	17.9 15.3	10.80 12.59	129.10	8.48
El Centro, Array 4, Anderson Rd. 10-15-79	S	6.6	12	28.6	349.65 483.64	77.65 37.05	48.0 11.9	12.29 11.14	199.09	14.39
El Centro, Array 5, James Rd. 10-15-79	S	6.6	12	30.5	367.21 517.19	86.56 43.99	51.9 21.8	15.44 36.09	432.30	38.42
El Centro, Array 6, Huston Rd. 10-15-79	S	6.6	12	29.5	424.06 341.30	108.84 63.05	55.2 27.0	10.53 11.87	1489.50	50.64
El Centro, Array 7, Imperial Valley 10-15-79	S	6.6	12	28.6	453.65 326.78	107.83 44.96	41.4 19.5	10.36 8.03	503.65	25.86
El Centro, Array 8, Cruickshank Rd. 10-15-79	S	6.6	12	29.5	457.37 598.25	47.71 53.43	29.3 22.2	9.61 11.80	347.68	12.17
El Centro, Array 10, Keystone Rd. 10-15-79	S	6.6	12	29.5	168.21 221.69	44.28 42.18	27.1 16.7	11.03 10.21	102.83	8.68
El Centro, Array 11, McCabe Sch. 10-15-79	S	6.6	12	29.5	374.54 355.41	39.21 35.01	3.4 14.1	12.01 11.57	137.43	11.54
El Centro, Array 12, Brockman Rd. 10-15-79	S	6.6	12	32.3	113.36 138.68	19.38 17.52	8.5 9.6	16.05 17.94	65.95	6.93

(Continued)

MODIFIED MERCALLI INTENSITY NOT DESIGNATED

Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel, cm/sec^2	Vert Vel cm/sec	Vert Displ cm	Vert Dur Sec ≥.05g	Hor Predom Period sec	Vert Predom Period sec	Type of Fault	Station Location	JMI
11.23 14.54	4.9 5.5	8.63 10.44	43.21	3.56	1.3	0.0	0.52 0.66	0.52	Strike-slip	32.96°N 115.32°W	
26.51 31.21	13.0 9.9	13.08 12.16	108.26	6.68	4.5	11.85	0.41 0.63	0.39	Stike-slip	32.92°N 115.37°W	
36.80 46.32	17.9 15.3	10.80 12.59	129.10	8.48	5.0	10.06	1.06 1.11	0.41	Strike-slip	32.89°N 115.38°W	
77.65 37.05	48.0 11.9	12.29 11.14	199.09	14.39	8.2	5.41	1.40 0.48	0.45	Strike-slip	32.86°N 115.43°W	
86.56 43.99	51.9 21.8	15.44 36.09	432.30	38.42	13.3	6.13	1.48 0.53	0.56	Strike-slip	32.86°N 115.47°W	
108.84 63.05	55.2 27.0	10.53 11.87	1489.50	50.64	13.0	8.85	1.61 1.16	0.21	Strike-slip	32.84°N 115.49°W	
107.83 44.96	41.4 19.5	10.36 8.03	503.65	25.86	10.2	6.13	1.49 0.86	0.32	Strike-slip	32.83°N 115.50°W	
47.71 53.43	29.3 22.2	9.61 11.80	347.68	12.17	11.6	18.38	0.66 0.56	0.22	Strike-slip	32.81°N 115.53°W	
44.28 42.18	27.1 16.7	11.03 10.21	102.83	8.68	4.9	4.57	1.65 1.20	0.53	Strike-slip	32.78°N 115.57°W	
39.21 35.01	3.4 14.1	12.01 11.57	137.43	11.54	7.1	8.49	0.66 0.62	0.53	Strike-slip	32.75°N 115.59°W	
19.38 17.52	8.5 9.6	16.05 17.94	65.95	6.93	4.6	4.57	1.07 0.79	0.66	Stike-slip	32.72°N 115.64°W	

(Continued)

Earthquake	Site Classification	Mag M_S	Focal Depth km	Distance to Source km	Hor Accel$_2$ cm/sec^2	Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel$_2$ cm/sec^2	Vert Vel cm/sec
El Centro, Array 13, Strobel Resid. 10-15-79	S	6.6	12	36.0	136.22 114.63	14.21 14.63	6.0 5.9	12.48 8.82	42.51	3.36
El Centro, Bonds Corner Hwys 98 & 115 10-15-79	S	6.6	12	13.4	770.42 575.73	44.07 43.63	14.6 12.2	18.87 18.97	347.68	13.17
El Centro, Differential Array 10-15-79	S	6.6	12	28.6	477.14 344.90	42.51 67.77	13.7 33.8	11.54 13.13	645.77	20.00
Brawley, Brawley Municipal Airport 10-15-79	S	6.6	12	43.7	216.52 162.17	37.12 35.29	10.6 18.7	11.55 11.63	150.40	8.54
Calexico, CA Calexico Fire Sta. 10-15-79	S	6.6	12	19.2	196.86 269.61	16.08 19.43	7.1 5.7	13.70 12.95	179.10	7.34
Calipatria Fire Sta., CA 10-15-79	S	6.6	12	58.2	77.66 122.70	12.54 14.67	5.4 6.9	1.12 1.90	54.61	4.11
Coachella Canal #4, CA 10-15-79	S	6.6	12	84.8	125.74 113.58	15.95 12.89	3.1 2.5	4.79 3.87	37.08	3.56
Holtville, CA Holtville Post Off. 10-15-79	S	6.6	12	22.5	213.06 246.19	48.37 44.67	22.3 25.3	14.02 11.67	223.72	9.93
Parachute Test Fac. 10-15-79	S	6.6	12	48.5	200.17 106.86	14.62 17.15	7.9 9.2	7.37 7.72	152.45	7.08
Plaster City, CA, Store-house 10-15-79	S	6.6	12	53.4	55.49 41.93	5.77 3.22	1.8 1.5	2.18 0.0	26.00	2.55
Superstition Mountain, CA 10-15-79	H	6.6	12	58.2	189.21 107.97	9.02 4.86	1.7 1.6	4.33 4.73	75.47	2.10

IFIED MERCALLI INTENSITY NOT DESIGNATED (Concluded)

Hor Vel cm/sec	Hor Displ cm	Hor Dur Sec ≥ .05g	Vert Accel, cm/sec²	Vert Vel cm/sec	Vert Displ cm	Vert Dur Sec ≥ .05g	Hor Predom Period sec	Vert Predom Period sec	Type of Fault	Station Location	MI
.21 .63	6.0 5.9	12.48 8.82	42.51	3.36	2.3	0.0	0.66 0.80	0.50	Strike-slip	32.71°N 115.68°W	
.07 3.63	14.6 12.2	18.87 18.97	347.68	12.17	2.5	18.38	0.36 0.48	0.22	Strike-slip	32.69°N 115.34°W	
.51 .77	13.7 33.8	11.54 13.13	645.77	20.00	10.4	9.88	0.56 1.23	0.20	Strike-slip	32.80°N 115.54°W	
.12 .59	10.6 18.7	11.55 11.63	150.40	8.56	2.9	13.16	1.08 1.37	0.36	Strike-slip	32.99°N 115.51°W	
.8 .13	7.1 5.7	13.70 12.98	179.10	6.24	2.0	12.30	0.51 0.49	0.22	Strike-slip	32.67°N 115.49°W	
.73 .27	5.4 6.9	1.12 1.90	54.61	4.11	2.9	1.10	1.01 0.78	0.47	Strike-slip	33.13°N 115.52°W	
.15 .93	3.1 2.5	4.79 3.87	37.08	3.56	0.7	0.0	0.80 0.71	0.60	Strike-slip	33.36°N 115.59°W	
.37 .67	22.3 25.3	14.02 11.67	223.72	9.92	4.7	9.68	1.43 1.14	0.38	Strike-slip	32.81°N 115.38°W	
.65 .15	7.9 9.2	5.37 7.72	152.45	7.08	4.9	8.27	0.46 1.01	0.29	Strike-slip	32.93°N 115.70°W	
.77 .37	1.8 1.5	2.18 0.0	26.00	2.55	1.1	0.0	0.65 0.48	0.62	Strike-slip	32.79°N 115.86°W	
.02 .86	1.7 1.6	4.33 4.73	75.47	2.10	0.7	1.50	0.30 0.28	0.18	Strike-slip	32.95°N 115.82°W	